



Overview

This historical recount follows the efforts of Doctor John Snow to isolate the cause of a cholera epidemic in London during the nineteenth century. In his struggle to convince the establishment of his theories, he developed a “spot map”, which identified cluster patterns of cholera deaths in areas around water pumps. Although not recognised at the time, he is now considered

a pioneer in the field of disease mapping. The article also contains information about the current impact and causes of cholera. The text is supported with additional information such as contemporary maps, photographs, and illustrations.

Texts related by theme

“The Good, the Bad, and the Ugly” Connected 2 2007 | “Pōwhiri for a Prince” SJ 3.2.07 |
“Double, Double, Toilet Trouble” Connected 2 2009

Text characteristics from the year 8 reading standard

sentences that vary in length, including long, complex sentences that contain a lot of information

adverbial clauses or connectives that require students to make links across the whole text

words and phrases with multiple meanings that require students to know and use effective word-solving strategies to retain their focus on meaning

It was now 7 September. More than four hundred people had died since the cholera outbreak. That night, Doctor Snow went to a meeting of the local parish governors to explain what he had learned – but he had no concrete evidence, and the governors weren't prepared to believe that drinking water was to blame. However, the pattern of the outbreak was undeniable, with the death rate in some parts of the parish more than double that in the rest of London. And so the following morning, a workman was sent to Broad Street to remove the pump handle.

But Snow wasn't satisfied. Too many people, including the General Board of Health, still believed that the killer lurked in the air, and the doctor knew there would be further epidemics until he could prove otherwise. He needed more evidence – and it came from an unexpected source.

More Evidence

Reverend Henry Whitehead had worked in the Soho district for many years. His parish had been ravaged by the cholera epidemic, but like nearly everyone else, Whitehead rejected the idea that the drinking water was to blame. The following year, with the support of the General Board of Health, Whitehead set out to disprove Snow's theory – and, hopefully, to prove his own: that the epidemic was caused by “divine intervention”.

A cartoon published in reaction to Snow's Broad Street pump theory

Reverend Henry Whitehead

Reverend Whitehead studied the demographics of the area, just as John Snow had done. Whitehead asked questions about where the victims had lived, the sanitary arrangements at their households, where they got their water, and when they got ill. And the more Whitehead discovered, the more he realised that John Snow was probably right.

When Whitehead had a breakthrough, he learned that on the morning of 2 August 1854, a baby living at number 40 Broad Street had developed severe diarrhoea. The baby's mother told Whitehead that she had soaked her daughter's nappies and then poured the water into the cesspit at the front of the house, 2 feet from the Broad Street pump. The baby's condition worsened, and she died on 2 September. At first, the doctor had said otherwise. Whitehead was convinced that the next levels had died of cholera and that the boggy water had somehow contaminated the well.

To learn exactly how water from the cesspool got into the well, Henry Whitehead decided to have the ground around the well dug up – and the mystery was finally solved. Cracks were discovered that had allowed the contents of the Levises' cesspool to seep into the well water. Figures show that this water had also been drinking diluted sewage and the cholera microbes contained.

20 Broad Street

cesspool

drain

street

well

4

6

7

metaphor, analogy, and connotative language that is open to interpretation

illustrations, photographs, text boxes, diagrams, maps, charts, and graphs, containing main ideas that relate to the text's content

academic and content-specific vocabulary

Possible curriculum contexts

SCIENCE (Nature of Science)

LEVEL 4 – Understanding about science:
Appreciate that science is a way of explaining the world and that science knowledge changes over time.

ENGLISH (Reading)

LEVEL 4 – Ideas: Show an increasing understanding of ideas within, across, and beyond texts.

ENGLISH (Writing)

LEVEL 4 – Ideas: Select, develop, and communicate ideas on a range of topics.

Possible reading purposes

- To learn about a London cholera epidemic in the nineteenth century
- To identify difficulties of living in nineteenth-century London
- To explore a scientific investigation
- To examine difficulties people face when proposing “new” explanations for a known issue.

Possible writing purposes

- To describe another disease and its causes
- To explain how disease mapping works
- To report on the impact of cholera in the world today.

See [Instructional focus – Reading](#) for illustrations of some of these reading purposes.

See [Instructional focus – Writing](#) for illustrations of some of these writing purposes.

Text and language challenges

VOCABULARY:

- Possible unfamiliar and/or specialist words and phrases, including “vicar”, “culprit”, “Cholera”, “epidemic”, “disease”, “sanitation”, “cesspool”, “sewage”, “night-soil men”, “devastating”, “potato famines”, “slums”, “horse-drawn carriages”, “Victorian writer”, “wretched”, “stench”, “miasma”, “contaminated”, “indoor plumbing”, “wells”, “public hand pumps”, “hypothesis”, “interviewing”, “established”, “cluster pattern”, “authorities”, “acquainted”, “proceeding”, “situated”, “they always sent to the pump”, “parish governors”, “concrete evidence”, “outbreak”, “undeniable”, “death rate”, “lurked”, “General Board of Health”, “ravaged”, “divine intervention”, “demographics”, “sanitary arrangements”, “breakthrough”, “diarrhoea”, “death certificate”, “diluted”, “cholera microbes”, “symptoms”, “spot map”, “widely accepted”, “acknowledged”, “pioneer of disease mapping”, “epidemiology”, “infectious”, “*Vibrio cholerae*”.

Possible supporting strategies

Identify new vocabulary that the students should prioritise for learning. *The English Language Learning Progressions: Introduction*, pages 39–46, has useful information about learning vocabulary.

After reading the first paragraph, discuss what the students know about cholera and other infectious diseases. Prompt the students, from previous reading, to generate known words that link to disease. Develop a word bank of useful words with definitions. Discuss with students what else is useful in a word bank. Add sentence examples, visual props such as illustrations, different forms of the words (where appropriate), and translations (where appropriate).

Explain to the students that language use changes over time, and provide an example of current vocabulary or sayings that were not in use twenty years ago. Explore the phrases and meaning from nineteenth-century writing. Possibly rewrite the letter to the editor using language of the twenty-first century.

SPECIFIC KNOWLEDGE REQUIRED:

- Knowledge of nineteenth-century living conditions, local government, and medical knowledge and practices
- Understanding of current and past sanitation systems
- The role of cartoons to depict social or satirical comment
- Knowledge of diseases and medicine.

Possible supporting strategies

Preview the text. Have the students share their reactions to the images with a partner. Support them to gain an understanding of what it was like in nineteenth-century London. Prompt connections to other texts they may have read or films they may have seen that depict the same era.

Explain that cartoons are a way for people to make statements about current issues, often in a satirical way.

TEXT FEATURES AND STRUCTURE:

- The title, which introduces a “killer” on Broad Street. The first paragraph continues this image and concludes by identifying the killer as cholera
- The nineteenth-century illustrations of life in London slums
- The breakouts – the description of nineteenth-century London, the excerpt from Charles Dickens’s novel *Little Dorrit*, the letter in handwriting appropriate to the nineteenth century, and the overview of the current state of cholera in the world
- The language for signalling time and sequence, for example, “On the morning of Friday”, “By the end of the day”, “soon”, “At the time”
- The language for signalling different types of relationships between ideas, for example, “In fact”, “Despite”, “But”, “Although”, “However” (contrast); “To stop”, “to escape”, “To learn” (purpose); “meant” (effect); “By interviewing” (method); “If he was to convince” (condition and consequence); “And so” (result)
- Prepositional phrases describing location, for example, “in London”, “In the district of Soho”, “into the street”, “from wells in the street”.

Possible supporting strategies

Explain that the article relates to a time one and a half centuries ago and includes supporting information about what life was like during that time. Use the description of nineteenth-century London to support the students in connecting to the period.

To support the students to follow the sequence of events and to identify the time markers, you could construct (either as a class or in pairs) a timeline. Put all the events into the timeline and note the time markers (or other information) that tell the reader when the events occur. Alternatively, you could use a graphic organiser to note each activity when it occurs, and perhaps also where. To do this, the students need to identify and understand the time markers and other signals of time and sequence as well as focus on language to show location.

For information about language for recounting and ideas on how to support students, see *Supporting English Language Learning in Primary Schools: A Guide for Teachers of Years 7 and 8*, pages 20–29. For information about ordering and a PDF of this booklet, go to <http://esolonline.tki.org.nz/ESOL-Online/Teacher-needs/Reviewed-resources/Supporting-English-Language-Learning-in-Primary-School-SELLIPS>

Instructional focus – Reading

Science (Nature of Science, level 4 – Understanding about science: Appreciate that science is a way of explaining the world and that science knowledge changes over time.)

Text excerpts from “The Broad Street Killer”

Many ended up living in slums, and the inner city swiftly became a place of crime, poverty, and disease. Raw sewage was pumped into the Thames ... and smoke from thousands of factories belched into the air.

But Snow wasn't satisfied. Too many people, including the General Board of Health, still believed that the killer lurked in the air, and the doctor knew there would be further epidemics until he could prove otherwise. He needed more evidence – and it came from an unexpected source.

To learn exactly how water from the cesspool got into the well, Henry Whitehead asked to have the ground around the well dug up – and the mystery was finally solved. Cracks were discovered that had allowed the contents of the Lewises' cesspool to seep into the well water.

... most nineteenth-century doctors and scientists agreed that this bad air, which they called “miasma”, carried disease. But one man thought differently.

To test his hypothesis,

... the governors weren't prepared to believe that drinking water was to blame.

Today, John Snow is remembered as a pioneer of disease mapping and the father of epidemiology. His name has not been forgotten.

Students (what they might do)

Students **locate, evaluate, and synthesise** information about nineteenth-century London contained in the text and illustrations. Students **make connections** to what they know about pollution and **form hypotheses** about the content of the text.

Students **locate and synthesise** information from across the text, tracking the actions of Doctor Snow and the reactions of the authorities. They **evaluate** these responses and draw conclusions about Doctor Snow's character.

Students **locate** information in the diagram and **make connections** to the text to support their understanding.

Students **analyse and synthesise** the information from across the text to identify how the scientific learning changed.

Teacher (possible deliberate acts of teaching)

PROMPT the students to discuss with a partner the living conditions in nineteenth-century London (as described in the text box and illustration) before reading the text.

ASK QUESTIONS to elicit the students' ideas about life in the nineteenth century.

- What do you think were the main problems for people? What were the causes?
- Why didn't the people leave London?
- The text tells us about pollutants in the air, in the water, and on the ground. We know a lot about pollution. How could these conditions have added to the poverty, crime, and disease?

PROMPT the students to make connections to the title and what they have read, and then to discuss with a partner what they expect the text to be about.

PROMPT the students to evaluate the reasons behind Doctor Snow's actions.

- I wonder why the authorities weren't convinced early on?
- I noticed the Broad Street pump was removed even though the governors did not believe that drinking water was to blame. I wonder why?
- Why did it matter to Doctor Snow that most people didn't believe that the disease was being spread by water?
- I wonder what life was like for Doctor Snow given that so many people did not believe him? (Refer to the cartoon.)
- We know that he wasn't satisfied and needed more evidence. What does this tell us about him as a person?

MODEL how a reader checks their understanding by using diagrams along with the text.

- As I was reading this part of the text, I looked at the diagram to see where the cracks were and how the water got contaminated.
- At first I was confused by the dotted lines, but now I see that they are pointing to the different parts that are underground.
- The diagram has helped me see how the contents of the cesspool and the well were connected.

ASK QUESTIONS to clarify the students' understanding.

- Doctor Snow faced many challenges and disbelievers. Why do you think it was so difficult for him to convince the city authorities? Do you think it would be any different today? Why?/ Why not?
- How has the world's scientific knowledge changed because of Doctor Snow? How?
- Why is he considered a pioneer of disease mapping? What is your understanding of “pioneer”?

GIVE FEEDBACK

- You used several pieces of information from across the text to conclude that science is not fixed and that ideas change. Think about how you did this, so that next time you're reading a complicated text you can draw your own conclusions.
- Great explanation of what was happening to cause so many deaths. You used the diagram as well to find information and that supported your understanding.
- The character traits you identified for Doctor Snow helped you to clarify the reasons for his actions. That was a good way of broadening your understanding of the text.

METACOGNITION

- What additional information sources in the text supported your understanding? Show me.
- What strategies did you use to work out unfamiliar words? Explain them to your partner.
- How has the spot map helped you to understand about disease mapping? Share with your partner.

Reading standard: by the end of year 8

The Literacy Learning Progressions

Assessment Resource Banks

Instructional focus – Writing

English (Level 4 – Ideas: Select, develop, and communicate ideas on a range of topics.)

Text excerpts from “The Broad Street Killer”

In the country the rain would have developed a thousand fresh scents, and every drop would have had its bright association with some beautiful form of growth or life. In the city it developed only foul stale smells, and was a sickly, lukewarm, dirt-stained, wretched addition to the gutters.

In the nineteenth century, cholera was a dreaded disease.

At the time, London was the largest city in the world ...

Instead of a proper sanitation system, many houses had a cesspool (a special pit for holding sewage), which often overflowed into the street.

Examples of text characteristics

TONE

Tone is the emotion or perspective an author wishes to convey, achieved through the use of vocabulary and/or phrasing.

The author’s choice of adjectives in the first sentence (“fresh”, “bright”, “beautiful”) contrasts with words such as “sickly”, “dirt-stained”, and “wretched” in the second.

CONNECTIVES (LINKAGES)

Phrases or words are used to make links within and between paragraphs. “At the time” is a prepositional phrase that makes a link to the previous paragraph, referring to the nineteenth century.

EXPLANATIONS

Some subject-specific vocabulary may need an explanation to give the reader enough information to make sense of the text. The explanation of “cesspool” is included within brackets. There are a variety of ways to do this, including use of diagrams, breakouts, a glossary, or within the context of the sentence (as in the example).

METACOGNITION

- You have decided to use a glossary. Why did you choose to do that?
- What was the tone you wanted to create for the reader? How did that influence your selection of vocabulary?
- You’ve introduced some prepositional phrases to add details about where things are and happen. How did you know where they needed to go?

Teacher

(possible deliberate acts of teaching)

EXPLAIN that authors develop a “tone” in their writing. For example, the tone might be impersonal, emotional, comic, and so on. From the tone, readers are able to gauge the author’s attitude towards the subject. Authors achieve this by using words and phrases that result in a tone. In pairs, have the students read the excerpt by Charles Dickens to identify the tone of his writing.

ASK QUESTIONS to clarify students’ ideas.

- How does the language differ when describing the city and the country?
- What do you notice about the sentences? Let’s read it aloud – what “feeling” do we get with the different emphases?
- We are quite clear about Charles Dickens’s attitude to the city. What did he do as a writer to show this?
- Look at your writing. What is the tone of the piece? How could you change it or improve it?

PROMPT the students to identify links made between paragraphs.

- Remember our previous work with paragraphs, how the ideas in a paragraph need to be related. We used language to connect our sentences. Who can give some examples?

PROMPT the students to find examples of connectives in the text.

- What is the link between the two paragraphs below “Under Suspicion” on page 2? How does this add to the text? Would something else have worked?
- Go back to your own writing. Look closely to identify places where using a connective would add to your writing or clarify your ideas for your reader.

To begin using (selected) connectives in their writing, some students may need:

- explicit explanations of the meanings and structures of the example sentences with connectives
- models of how to use the connectives in other sentences
- opportunities to co-construct sentences using the connectives
- opportunities to complete cloze sentences by selecting the correct connectives
- prompting and guidance on using them in their writing
- feedback on their use of connectives.

EXPLAIN that some subject-specific vocabulary needs to be explained so that readers will understand the content.

- As writers, we need to think about ways to help readers understand vocabulary that may be unfamiliar. We have read some texts that had subject-specific words we didn’t know – what helped us?

PROMPT the students to brainstorm known methods of explaining subject-specific vocabulary.

- In the text, how did the author tell us what “cesspool” meant? How else might this have been done?
- Scan the text for other subject-specific words. Did the author give an explanation? If so, how was this done?
- Writers decide which words need explanation, and this depends on the intended audience. Reflect on your own writing. Is there any vocabulary that needs explaining?

GIVE FEEDBACK

- I see you have added in a phrase to help the reader understand the subject-specific word. That makes it much easier to understand.
- Your paragraphs flow well now. The connectives at the beginning of the paragraphs have really helped you to link the ideas.

 Writing standard: by the end of year 8

 The Literacy Learning Progressions