SIMHISTORY · LESSON PLAN · FOR THE TEACHER

Broad Street Inquiry

Soho, London, 1854: finding the source of a cholera outbreak with John Snow's map

Grades 9–12 adaptable for 6–8	**45–60 min** one class period	**World History** Geography · Science & Health	**Free** no student accounts

Everything in this lesson is free. Broad Street Inquiry is SimHistory's free class activity: the teacher's desk, students joining on their own devices, the projector map, the worksheet and this plan. No Teacher Plus needed.

Overview

In late August and early September 1854, cholera killed hundreds of people in a few streets of Soho, London. Students act as investigators with the evidence Dr. John Snow used. The teacher's desk controls a shared map of Snow's district. Each round, students study the map, answer questions, suggest what evidence to add, and mark the place they suspect. The teacher reveals evidence in response, until the class can name the source of the outbreak and prove it.

The lesson is a case study in the urban growth of the Industrial Revolution and in historical reasoning: forming hypotheses, testing them against new evidence, telling a pattern from a cause, and arguing from evidence.

Learning objectives

Students will be able to:

1. Describe how crowded industrial cities such as London depended on shared water and drainage, and why that made outbreaks deadly.
2. Read a historical map as evidence: identify patterns in where deaths occurred and form a hypothesis about their cause.
3. Revise a hypothesis as new evidence is revealed, and explain cases that seem not to fit (exceptions near and far from the source).
4. Distinguish a correlation (deaths near something) from a cause, and explain what evidence supports a causal claim.
5. Write a claim naming the source of the outbreak, supported by specific evidence from the map.

Standards covered

STANDARD	WHAT STUDENTS DO
CA HSS 10.3.3	Growth of population, rural-to-urban migration and the growth of cities in the Industrial Revolution

STANDARD	WHAT STUDENTS DO
CA HSS HR 4	Construct and test hypotheses; collect and evaluate evidence from multiple primary and secondary sources
CA HSS HI 2	Recognize the complexity of historical causes and effects
C3 D2.Geo.2.9-12	Use maps to explain relationships between places and what happened there
C3 D2.His.14.9-12	Analyze multiple and complex causes and effects of events in the past
C3 D2.His.16.9-12	Integrate evidence from multiple historical sources into a reasoned argument
CCSS RH.9-10.3	Decide whether earlier events caused later ones or simply came before them
CCSS RH.9-10.7	Integrate quantitative or technical analysis (maps, data) with qualitative analysis
CCSS WHST.9-10.1	Write arguments focused on discipline-specific content
CCSS RH.6-8.7	Integrate visual information, such as maps, with other information

Summaries. Official text: California History–Social Science Content Standards; California History–Social Science Analysis Skills, grades 9–12; C3 Framework for Social Studies State Standards (NCSS); Common Core Literacy in History/Social Studies.

Materials

- **Teacher:** a computer with the teacher's desk open (simhistory.org → Broad Street Inquiry → Run it with my class) and a projector or smartboard showing the main screen.
- **Students:** any device with a browser (Chromebook, laptop, tablet or phone). They go to **simhistory.org/broadstreet** and type the join code and their name. No accounts or apps.
- **No devices?** Run the desk and the projector only, and have students answer on the printable worksheet. You add their ideas to the map with **Add to map**.
- **Answer sheets:** students' answers reach your desk as they type. For a graded copy, students click **I'm finished** to download a PDF (certificate plus their answers) for Google Classroom, or hand in the printed worksheet.

Before class (5 minutes)

- Open the teacher's desk and click **New class** and pick the period, so each period has its own game and join code (switch with the **Class** menu).
- Open a second window on the projector and click **Switch this window to projector view**. Tick **Show the join code on the projector**.
- First time? Use **Try it side by side** to play teacher and student at once (about five minutes).

Procedure

Times are suggestions for a 50-minute period. Each round button brings that round's evidence onto every map: the deaths (Round 1), the water pumps (Round 2), and the workhouse and brewery (Round 3). The **Layers** tab is for testing students' own ideas.

Hook and setup about 5 minutes	• Students join. Open the **Case file** on the main screen and read *The problem* and *Cholera basics* together, then *How to play*. • Keep it short. The case file leaves out how cholera spreads on purpose: that is what the class discovers.
Round 1 The deaths · 10–12 min	• The map shows only the deaths. Students answer the Round 1 questions. • Click **Ask the class for ideas**. Ideas arrive on your **Ideas** tab; show the anonymous ideas wall on the main screen when ready. • Test their theories with layers: *bad air* → sewer vents and gullies; *sewage* → sewers; *disease from the dead* → the old plague pit. • **If a student mentions the pumps or the water,** don't reveal them yet: "Good thought. Hold on to it. We'll come back to that in the next round."
Round 2 The water pumps · 10–12 min	• Click **Round 2**: the 13 street pumps appear. **Goal: lead the class to the Broad Street pump.** • Ask: "Look at where the deaths cluster. Which pump is at the center? How could we test whether that pump is the cause?" Reveal distance rings or pump neighborhoods when students ask how close. • Students mark the source they suspect. Turn on **Show students' source guesses** to see where the class is leaning.
Round 3 The exceptions · 10–12 min	• Click **Round 3**: the workhouse and the brewery appear. **Goal: complicate the theory.** • Ask: "If the Broad Street pump is to blame, why did only 5 of 535 people in the workhouse die, and none of the brewery's 70 workers?" (Both had their own wells; the brewery men drank beer.) • Then the deaths on the edges of the map: reveal the percussion cap factory and the Hampstead widow.
Wrap-up 8–10 min	• Reveal *The rest of the story*: the cesspool at 40 Broad Street and the removal of the pump handle on 8 September. • Exit question: *Name the source of the outbreak and give the two strongest pieces of evidence from the map.* • Students click **I'm finished** for their certificate and answer PDF. Review answers under **Answers**. • Not finished? Click **Save game** on your desk. Next period, click **Open saved game**; students rejoin with the same code.

Student questions

Round 1: The deaths

1. Observe & Hypothesize: What patterns do you see on this map?
2. Analyze: Based on your current information, what do you think could be causing the outbreak?

3. Hypothesize: What additional information would help you discover the cause? Is there anything you would add to the map?

Round 2: The water pumps

4. Observe & Hypothesize: What new patterns do you see on this map?
5. Analyze: Based on your current information, what do you think could be causing the outbreak?
6. Hypothesize: What additional information would help you discover the cause? Is there anything you would add to the map?

Round 3: The exceptions

7. Observe & Hypothesize: If the cause is the Broad Street pump, why are there still deaths on the outskirts near Piccadilly (south) or Oxford Street (north)?
8. Analyze: People from the workhouse and brewery didn't die like everyone else even though they lived and worked near the pump. Why might that be?
9. Analyze: If you were John Snow, and you believed the pump was the culprit, how would you attempt to solve the problem?

Teacher background and answer key

For the teacher only. Don't share before the class has worked through the evidence.

The source

The Broad Street pump. Deaths cluster tightly around it, and the clearest exceptions point back to its water.

Key evidence, as it appears in the inquiry

- **The pumps.** Most Soho homes had no running water; families carried drinking water from public pumps over shallow wells. The deaths center on the Broad Street pump.
- **The workhouse.** The Poland Street workhouse held 535 people and only 5 died. It had its own well, and inmates never used the Broad Street pump.
- **The brewery.** None of the roughly 70 men at the Lion Brewery on Broad Street died. They had a daily beer allowance and the brewery's own deep well.
- **The percussion cap factory.** At 37 Broad Street, workers drank from tubs filled with pump water. Eighteen died, many living outside the outbreak area, which helps explain deaths on the edges of the map.
- **The Hampstead widow.** Miles from Soho, she had Broad Street water carried to her because she liked the taste. She drank it on 31 August and died on 2 September; her visiting niece also drank it and died. There was no other cholera near either home.
- **Red herrings.** Drains and sewers, and the rumored 1665 plague pit (no deaths in Little Marlborough Street, which runs over it), test the "bad air" (miasma) explanation most people believed in 1854.
- **The cesspool at 40 Broad Street.** At the house beside the pump, a baby fell sick in late August; her soiled diapers were rinsed into the cesspool at the front of the house. An 1855 inspection found its brickwork decayed, less than three feet from the well.

- **The handle.** On 7 September Snow presented his evidence to the parish Board of Guardians; the next day the pump handle was removed. Officials were not fully convinced, and most still blamed miasma.

What to listen for

- **Correlation vs. cause:** "the deaths are near the pump" is a pattern. The workhouse, brewery, factory and widow show who drank the water and who didn't, which is what makes the case causal.
- **Explaining exceptions:** strong answers explain both the people who lived near the pump and survived, and the people who died far away.
- **Changing minds:** credit students who revise a first hypothesis (bad air, sewers, the plague pit) when the evidence turns against it.

Assessment

- **Formative:** students' answers and suspect pins on your desk during each round; the ideas wall.
- **Summative:** the final claim and evidence (Round 3 and the exit question). Suggested rubric: a clear claim naming the source (1), two or more pieces of specific map evidence (2), an explanation of at least one exception (1), and reasoning that goes beyond nearness to show cause (1).

Model answers (for norming)

Three sample answers to the exit question, "Name the source of the outbreak and give the two strongest pieces of evidence from the map." Use them to calibrate scoring, or have students score them. Written for the game.

Developing: "It was the water pump because a lot of people died there."

A claim with one vague piece of evidence and no reasoning.

Proficient: "The Broad Street pump. Most deaths are within a few hundred meters of it, and more deaths fall in its pump neighborhood than any other. The workhouse had its own well and almost no one died, which fits."

A clear claim, two specific pieces of map evidence, and an exception explained.

Advanced: "The Broad Street pump. The deaths cluster around it rather than around the sewer vents or the plague pit, which rules out bad air. The outliers fit too: the brewery men drank beer and their own well water, and the Hampstead widow drank Broad Street water carried to her miles away. Deaths were already falling before the handle came off, so removing it proved less than the pattern did."

Rules out other theories, uses outliers as support, and weighs the limits of the evidence.

Differentiation

- **Support:** pair students on one device; read the evidence cards aloud; reveal the pumps early; use sentence starters ("The deaths cluster near..., which suggests...").
- **Middle school:** focus on Rounds 1 and 2 and the workhouse; the exit question can be answered orally.
- **Extension:** compare Snow's map with a modern outbreak map; research the 1858 "Great Stink" and the building of London's sewers; discuss why officials still doubted Snow.

Works cited

- Snow, John. *On the Mode of Communication of Cholera.* 2nd ed., John Churchill, 1855. Public domain.
- Cholera Inquiry Committee. *Report on the Cholera Outbreak in the Parish of St. James, Westminster, during the Autumn of 1854.* John Churchill, 1855.
- Cooper, Edmund. Report to the Metropolitan Commission of Sewers on the house-drainage in St. James, Westminster, 22 Sept. 1854. London Metropolitan Archives, via the John Snow Archive and Research Companion, Michigan State University.
- Tobler, Waldo, and Rusty Dodson. Digitization of John Snow's cholera map. NCGIA, UC Santa Barbara, 1992.
- Frerichs, Ralph R. *John Snow* website. UCLA Fielding School of Public Health.
- Worksheet questions from "Defeating Cholera With Maps," Rounds 1–3.
- Standards: California Department of Education; National Council for the Social Studies (C3 Framework); Common Core State Standards Initiative. Linked above.

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