

RESOURCE LIBRARY
ACTIVITY : 45 MINS

Mapping A London Epidemic

Students analyze patterns of cholera in an area of London, similar to how Dr. John Snow, father of epidemiology, did in 1854.

GRADES

5 - 8

SUBJECTS

Biology, Health, Geography

CONTENTS

2 PDFs, 2 Images

OVERVIEW

Students analyze patterns of cholera in an area of London, similar to how Dr. John Snow, father of epidemiology, did in 1854.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/mapping-london-epidemic/>

DIRECTIONS

1. Brainstorm ways that mapping can help to solve problems.

Ask students if they can think of ways that people use maps to solve problems. Ideas might include figuring out which roads to use to evacuate an area in danger of a hurricane or finding your way around a mall. Encourage students to think broadly about information that can be put on maps. Ask: *What might we find out from mapping where people with the flu or*

another illness live or travel? Explain that often the scientists and researchers who study disease outbreaks, like the flu, use mapping to determine how to stop an illness from spreading further.

2. Have students analyze the map of cholera in London.

Distribute a copy of the worksheet Mapping a London Epidemic to each student and, if possible, also project the color map of Cholera Deaths in Soho for students to refer to. Have students work individually or in pairs to complete Part 1 by reading the summary, analyzing and discussing the map of cholera deaths, and answering the questions. Students can use colored pencils to mark the maps per the directions or as part of discussions. Have a whole-class discussion once students have answered questions 1 and 2. Ask:

- *What does each dot represent?* (a home where there was a cholera death)
- *Where are most of the cholera deaths concentrated?* (Most are in the area bordered by Marlborough, Berwick, Brewer, and King Streets.)
- *How might mapping where people who died from cholera lived be helpful?*
- *How do you think cholera might have spread?*
- *What other information might have been helpful for Dr. Snow's analysis?*

3. Have students analyze the map of water pumps.

Have students complete Part 2 of the worksheet. if possible, also project the color map of Water Pumps in Soho for students to refer to. Discuss their answers. Ask:

- *Which pump do you think might have had cholera-infected water? Why?* (The Broad Street pump had the infected water because it was right at the center of most deaths.)
- *Why would Dr. Snow have combined the information on the two maps into one map to present his findings to authorities?* (This would reinforce the cause-and-effect relationship between the pump and the deaths.)
- *Why might cholera deaths have occurred among people who lived farther away from the "killer pump"?* (Though it was not the closest pump to their home, they might have drunk water from it when in the area.)

4. Discuss the process of problem-solving Dr. Snow used.

Have students work in pairs to write a short outline of how Dr. Snow tackled the epidemic problem. Ask: *What key steps did he take?* Discuss ideas as a whole class.

Tip

To reinforce the combining of data from the worksheet's two maps, have students represent the information from the first map on the second, and vice versa. Students might mark the pumps on the first map, and then shade the area of concentrated cholera cases on the second map. This also shows different ways of displaying information on maps.

Informal Assessment

Have students complete the provided Solving Problems With Maps worksheet to demonstrate analysis of spatial data.

Extending the Learning

- Have students use the map scales to figure out the size of the area Dr. Snow studied, and use a map of their city or town to make a comparison. Have students use Google Maps to locate the Soho area of London to see how little the layout has changed over 150 years. (One difference is that Broad Street is now called Broadwick Street.)
- Ask students to think about what Dr. Snow's next steps might have been after he completed his study. For example, he might have written a letter to London's city council explaining his findings and advising the council on what he thought should be done to end the epidemic. Have students write such a persuasive letter presenting his findings and proposed solution.
- Have students research the geography of recent epidemics and pandemics, including the SARS, H1N1, and Ebola outbreaks. Another option would be to have students research the influenza pandemic that swept the world in 1918-1919, including where it started, where it spread, and what its effects were.
- Have students use Internet or library resources to do further research on the life of Dr. John Snow, the "father of epidemiology," in order to find out how that science is so important today. Students can also research medical and health geography to find out their connections to epidemiology.

OBJECTIVES

Subjects & Disciplines

Biology

- Health

Geography

Learning Objectives

Students will:

- analyze maps to solve problems
- follow steps taken in mapping an epidemic and evaluate how conclusions were drawn

Teaching Approach

- Learning-for-use

Teaching Methods

- Brainstorming
- Discussions
- Visual instruction

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Learning and Innovation Skills
 - Communication and Collaboration
- Critical Thinking Skills
 - Understanding
- Geographic Skills

- Analyzing Geographic Information

National Standards, Principles, and Practices

NATIONAL GEOGRAPHY STANDARDS

- Standard 1:

How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

- Standard 18:

How to apply geography to interpret the present and plan for the future.

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- Reading Standards for Informational Text K-5:

Key Ideas and Details. RI.4.1

- Reading Standards for Informational Text K-5:

Key Ideas and Details, RI.4.3

THE COLLEGE, CAREER & CIVIC LIFE (C3) FRAMEWORK FOR SOCIAL STUDIES STATE STANDARDS

- Geographic Representations: Spatial Views of the World: D2.Geo.2.3-5:

Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions and their environmental characteristics.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Colored pencils
- Pencils, pens

REQUIRED TECHNOLOGY

- Internet Access: Optional
- Tech Setup: 1 computer per classroom, 1 computer per pair, Projector

PHYSICAL SPACE

- Classroom

GROUPING

- Large-group instruction

BACKGROUND & VOCABULARY

Background Information

Mapping can serve as a tool for finding solutions to a variety of problems. Mapping, whether done by hand or with advanced computer mapping techniques, assembles information in a form that can be interpreted to answer crucial questions.

Dr. John Snow is considered the father of epidemiology, the study of patterns, causes, and effects of health and disease conditions in populations.

Mapping and analysis techniques are used in epidemiology and also in health geography, or medical geography, to determine the patterns and distribution of disease from local to global scales. Health and disease are not distributed randomly in a population; there are patterns to a disease's occurrence and diffusion. Analysis, including spatial analysis, of the patterns of health and disease can provide clues for formulating hypotheses about their possible causes.

Prior Knowledge

Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
cholera	<i>noun</i>	infectious, sometimes fatal disease that harms the intestines.
disease	<i>noun</i>	harmful condition of a body part or organ.
epidemic	<i>noun</i>	outbreak of an infectious disease able to spread rapidly.
epidemiology	<i>noun</i>	study of how disease spreads and can be controlled.
map	<i>noun</i>	symbolic representation of selected characteristics of a place, usually drawn on a flat surface.
map skills	<i>noun</i>	skills for reading and interpreting maps, from learning basic map conventions to analyzing and comprehending maps to address higher-order goals.
medical geography	<i>noun</i>	area of medical research that incorporates geographic techniques into the study of health around the world and the spread of diseases. Sometimes called health geography.
outbreak	<i>noun</i>	sudden occurrence or rapid increase.
spatial thinking	<i>noun</i>	collection of learned skills including the elements of concepts of space, tools of representation, and processes of reasoning.

For Further Exploration

Websites

- [Teach Epidemiology](#)
- [U.S. Center for Disease Control and Prevention: Traveler's Health](#)

