



California Geographic Alliance Lesson Plan

Fighting Disease With Geography

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Grade: 4-12
Subject: History Social Science
California Academic Content Standards: Historical Thinking and Analysis Skills
Chronological/Spatial Thinking
Research/ Evidence/ Point of View
Historical Interpretation

4.2 Students describe the social, political, cultural, and economic life and interactions among people of California from the pre-Columbian societies to the Spanish mission and Mexican rancho periods.

- 3 Describe the Spanish exploration and colonization of California, including the relationships among soldiers, missionaries, and Indians (e.g., Juan Crespi, Junipero Serra, Gaspar de Portola).

5.3 Students describe the cooperation and conflict that existed among the American Indians and between the Indian nations and the new settlers.

- 4 Discuss the role of broken treaties and massacres and the factors that led to the Indians defeat, including the resistance of Indian nations to encroachments and assimilation (e.g., the story of the Trail of Tears).

6.4 Students analyze the geographic, political, economic, religious, and social structures of the early civilizations of Ancient Greece.

- 1 Discuss the connections between geography and the development of city-states in the region of the Aegean Sea, including patterns of trade and commerce among Greek city-states and within the wider Mediterranean region.

7.6 Students analyze the geographic, political, economic, religious, and social structures of the civilizations of Medieval Europe.

- 7 Map the spread of the bubonic plague from Central Asia to China, the Middle East, and Europe and describe its impact on global population.

8.12 Students analyze the transformation of the American economy and the changing social and political conditions in the United States in response to the Industrial Revolution.

1. Trace patterns of agricultural and industrial development as they relate to climate, use of natural resources, markets, and trade and locate such development on a map.

10.5 Students analyze the causes and course of the First World War.

1. Analyze the arguments for entering into war presented by leaders from all sides of the Great War and the role of political and economic rivalries, ethnic and ideological conflicts, domestic discontent and disorder, and propaganda and nationalism in mobilizing the civilian population in support of "total war."

11.11 Students analyze the major social problems and domestic policy issues in contemporary American society.

- 6 Analyze the persistence of poverty and how different analyses of this issue influence welfare reform, health insurance reform, and other social policies.



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12.3 Students analyze the influence of the federal government on the American economy.

1. Understand how the role of government in a market economy often includes providing for national defense, addressing environmental concerns, defining and enforcing property rights, attempting to make markets more competitive, and protecting consumers' rights.

Objectives:

Students will:

1. Examine maps to draw conclusions about the spread of disease
2. Understand how maps can provide useful information about an issue
3. Understand how maps can be used to solve problems

Instructional Strategy:

Lecture/Discussion

Mapping

Small group work

Teacher Background:

Teachers need to know about Dr. John Snow's efforts to identify the cholera vector. They also need to know about the Influenza Pandemic of 1918-1919 and the recent research on the H5N1 virus. Suggested resources include, but are not limited to:

Cholera:

Johnson, Steven. [Ghost Map](#).

Influenza:

Barry, John M. [Great Influenza](#).

Kolata, Gina. [Flu](#).

Smallpox:

Notes on smallpox

Instructions for smallpox lesson

General:

Giblin, Perry Cross. [When Plague Strikes](#).

Hoff, Brett. [Mapping Epidemics](#).

These lessons have been adapted, but the original lessons from National Geographic Xpeditions are below. The influenza timeline, smallpox lesson and smallpox notes have been included as part of that adaptation.

Student Background:

Students generally don't know much about the great epidemics of history. They have a nodding acquaintance with the Black Death, but that is not covered here specifically. Extensive student knowledge is not required for this lesson as its purpose is to create knowledge in the students. This would be part of a larger unit either in a World History (industrialization or World War I) or US History (WWI) course. By adding additional diseases such as smallpox and/or bubonic plague, this could also be used in an early American History course or Ancient/Medieval History course.



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Learning Context: This lesson connects to ongoing discussions about the uses of geography and the implications of such uses for modern times.

Big Idea - Essential or Guiding Question: Can humans use geography to improve public health?

Instructional Materials: Laminated world desk maps (1 per pair) or printed [outline maps of the world](#)
Desk map markers (vis-à-vis pens)
Cholera Handout 1: [Information about Cholera](#)
Cholera Handout 2: [Cholera Map](#)
Cholera Handout 3: [Cholera Map with Pumps](#)
Influenza Timeline can be found [here](#).

Resources: None other than those listed above in “Instructional Materials.”

Optional: video “Influenza” American Experience pbs.org

Duration: Cholera: 20-40 minutes
Influenza: 50+ minutes
Smallpox: 20-50+ minutes
This lesson can be completed in sections or as one complete piece on uses of mapping in tracking and understanding the spread of disease.

Procedure

Introduction/

Anticipatory Set:

Have students use atlases to locate Great Britain and London. Tell students that in September 1854, during the last great cholera epidemic in Great Britain, 500 people—all from the same section of London, England—died of the disease within a ten-day period. Bacteria were still unknown. People were panicking. Distribute or read Handout 1 to students.¹

Ask students to identify diseases that have ravaged human populations throughout history. Examples may include the bubonic plague, yellow fever, malaria, AIDS, chicken pox, measles, polio, tuberculosis, and the flu.

Have students individually list factors that would promote or hinder the spread of new strains of flu. After a few minutes, ask students to share their lists. Write their ideas on the board or a large sheet of paper. The final list should include contact with other people, unsanitary conditions, travel to other lands, and



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contact with other living organisms that are carriers, or "vectors," for the flu.²

Instruction:

1. Dr. John Snow was a British doctor who had been studying cholera for many years. In trying to determine the source of cholera, Dr. Snow located every cholera death in the Soho district of London by marking the location of the home of each victim with a dot on a map. Distribute the handout "Map of Cholera Deaths" and have students focus on the spatial distribution of cholera deaths.
2. Have students formulate questions about the map. (For example, why is there a cluster of deaths near Broad Street? Why are there fewer deaths on Regent Street?) Ask students to speculate as to the spread of cholera deaths.
3. Have students predict the location of pumps. Record student responses on the chalkboard. After discussing the distribution of cholera deaths, distribute Handout 3, "Map of Cholera Deaths and Locations of Water Pumps." Ask students to formulate additional questions—for example, why were there so many deaths near Broad Street? (Explain to students that water pumps were the only source of drinking water.)¹

4. Have students work in small groups to research the influenza pandemic of 1918-19 in print and/or on the Internet (they might want to begin with the resources in the Related Links section, below). Items to pay particular attention to include the following:
 - Location of outbreak
 - Description of location (e.g., isolated region, military base, or urban area)
 - Age of victims
 - Number of dead in location
 - Length of illness before death
 - Means of prevention (e.g., gauze masks, or quarantine of individuals or villages)
 - Primary means of contraction



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5. Students should compile their findings on blank outline maps of the world, labeling them with dates of reported outbreaks, number of deaths, and possible means of contraction.²

Alternately, instead of #4 and #5 as is, have students complete the Influenza Timeline (attached) marking the laminated desktop maps.

Guided Practice:

2a. Give student pairs handout “Cholera Map.” Instruct them to examine the map and draw conclusions with just the data they are given. Teacher should move about the room encouraging sound conclusions and/or correcting any misconceptions about the map. Point out some of the blank spaces in the map. As what might account for that.

4a. For influenza and smallpox: have students read from timelines and, in pairs, find and mark the locations on the desk map.

Independent Practice:

3a. Give student pairs the last handout “Cholera Map with Pumps.” Have students discuss the implications of the pumps in relation to disease cases and make recommendations on what should be done to stop the spread of the disease.

Students should be able to complete the timeline for influenza and small pox on their own after having an example modeled, then doing an example in guided practice.

Closure:

6. Ask students what course of action they would take if they were city officials presented with the information on Dr. Snow’s map. Then tell students that Dr. Snow requested city officials to remove the handle from the Broad Street pump, making it impossible to get water there. After his request was granted, the number of new cholera cases in the area declined dramatically—almost to zero. Dr. Snow’s theory was confirmed: Cholera was associated with the drinking water supply, and the water was carrying the disease to its victims.¹

7. Students should compare maps and analyze the pattern of the diffusion of the flu pandemic. Have the students look for similarities and differences in



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the number of deaths. What could account for some of these patterns? Have the students make generalizations about the spread of the flu.

8. Students should share their results with the class by identifying on a large map of the world the impacts of the disease. Have a classroom discussion on the world's preparedness for the next outbreak of an extremely lethal strain of the flu.²

Assessment:

Ask students to list the steps that Dr. Snow took in solving the cholera problem in London. Ask them to answer these questions: What if the locations of deaths and locations of water pumps (Handout 3) were not clustered? How might this have altered Dr. Snow's research and course of action? Have students identify particular problems and issues that might be better understood through map development and analysis—for example, the occurrence of auto accidents, tornadoes, earthquakes, or crimes.¹

Tell students they will play the role of epidemiologists (health workers who study the incidence, distribution, and control of disease) at the U.S. Centers for Disease Control and Prevention (CDC). They have been asked to plan a strategy to contain a virulent flu outbreak in a populous part of the world today, such as Western Europe. What features today would cause the flu to diffuse faster and farther? What features today would help slow and contain the flu? Have them write reports taking these factors into consideration, including information about more recent public health issues, such as the SARS virus.²

Extension Activities:

Discuss some questions that are important to medical geographers: Where are diseases found? How do diseases spread? Is there a pattern to the spread of disease? Are some diseases more common in some environments than in others? Are the locations of health-care facilities important? Are they related to patterns of disease?

Have students research the spread of specific diseases, for example, AIDS, smallpox, malaria, or typhoid, then use medical atlases to research and plot the spread of diseases on blank outline maps.

Give students (or have them acquire) information on traffic accidents in your community. (This information should be



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available from local police or the county sheriff's office.) Plot the accidents on a map and have students formulate questions and draw conclusions based on the data. Perhaps there is a need for a stop sign, traffic signal, or lower speed limit in a particular area.¹

Expansion diffusion can be mapped to show the extent of different flu pandemics, as well as to identify permeable barriers to the disease's spread. Have the students identify areas that were spared the flu in 1918-19. What barriers may have slowed the spread of the flu? Ask students to explain what humans have learned about the spread of disease.²

Reflection:

Over the years, Michele and Natalie have altered the lesson quite a bit. For example, the influenza portion is now done with a teacher created timeline and laminated desk maps. This was done because the purpose of the lesson wasn't the research; it was to see where the disease spread and how thoughtful studying of maps might have lessened the disaster. Michele and Natalie are not sure who originally wrote the smallpox lesson plan.

One of the best things about this lesson is that the students are physically mapping the diseases. They can see the spread of disease in a tactile way. Generally speaking, it is one of the most memorable lessons of the year.

Sources:

1. "Fighting Cholera With Maps." Lesson Plans. 01 January 2001. National Geographic Society. 10 Jul 2008 < <http://tinyurl.com/5mwfmz> >.
2. "Geographic Diffusion of Disease: The Flu Pandemic of 1918-19." National Geographic Xpeditions. 01 January 2008. National Geographic Society. 10 Jul 2008 < <http://tinyurl.com/65luos> >.