



A PILOT DVD PROJECT

CONTAGION: THE SPREAD OF DISEASE

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Activity: Which Well?

Time Frame: 90 minutes

Materials: 20 photocopy acetates, 2 different colors of wet erase markers per group, overhead projector

Teacher Directions:

- Prepare a set of 20 different overheads by photocopying from the masters. You have been provided with two sets of masters. **One is a reverse set to be used when photocopying onto acetates.** The other, direct set can be photocopied onto paper. By using a reversed set you will photocopy the image on the underside and be able to re-use the acetates from class to class.
 - Each of the 20 student data sheets has a different set of coordinates for the deaths, but the same coordinates for the wells. Above the word "Well" in the data table is a sequence number (1-20) to allow you to keep track of the data sheets.
 - While you can photocopy on plain paper and have the students compare their results, the effect of the fully aligned set of maps on an overhead is quite impressive. You may want to align the sheets ahead of time and punch holes in the border to assist in lining them up on the overhead. (Photocopy machines are temperamental and your sheets will probably not line up with the edges unless you are exceptional careful in photocopying the originals).
- Watch Lecture 1 Chapter 8
 - Ask: Where do epidemics come from?
 - Ask: Where do emerging diseases come from?
- Give each pair of students an acetate and two different colored erasable markers. Instruct them to mark and label each well and to put a dot on the map for each death. The markers in the directions are red and black. However, obviously you can use any two different wet-erasable markers that work with your overheads.
- The death data for sheet will clump around the affected well. Overlapping the sheets emphasizes the strength of the data correlation between deaths and the Broad Street Well. Overlap as many sheets as possible on your overhead projector.
- You do not have to use all 20 sheets to get the effect; any reasonable sub-set of the data will do.

- On these data sheets and grids the Broad Street Well plots at 56,55 and is designated “Well # 7.” An actual copy of Dr. Snow’s map is attached.
- After the simulation lead a discussion on epidemics in societies before the acceptance of the germ theory of disease.
 - Ask: Why didn’t everyone die?
 - Ask: Why didn’t everyone get sick?
- Watch Lecture 4 Chapters 31 & 32
 - Ask: How has global travel changed the dispersal of disease?
 - Ask: How was West Nile Virus introduced into the US? What is the vector? What is happening?
 - Ask: What is the source of Dengue fever? What is the vector? How was it introduced to the US?
 - What does the Customs Service do to try to prevent disease? Besides human diseases what other diseases affect our society? Discuss animal diseases (like mad cow, foot and mouth, and plant diseases).

Student Directions: See attached “Which Well?”

Evaluations:

Student maps and answers to the questions within the student directions “Which Well?”

Students should write a newspaper article for a US newspaper, interviewing Dr. Snow in 1854 following his removal of the well handle. The article should explain the cholera epidemic and his theory of disease transmission.

Students can prepare a timeline of the development of the germ theory of disease, highlighting Dr. Snow’s contributions.

Extensions:

- Discuss *E.coli* contamination of hamburgers.
 - Ask: Is this an epidemic?
 - Ask: Why wouldn’t the cholera epidemic Dr. Snow traced back to one water pump and today’s occasional *E.coli* outbreak be susceptible to contact-tracing? Why are these bacterial diseases spread in the same way toxins or poisons rather than as infections?
 - Due to modern sanitation many food borne bacterial infections seem have point sources. There are limited or no secondary

infections because person-to-person transmission is reduced or eliminated by common hygiene and sanitation.

- Ask: What might happen if a point source epidemic, such as one started by contaminated beef, happened in a third world country?
- Write a TV newscast about an outbreak pneumonic plague (a bacterial disease spread by fleas which are carried by rats) in India. Students should focus on sources of large populations of rats, such as food warehouses and grain storage facilities. The 1990's outbreaks can be used as examples. Students should provide suggested solutions in their newscast.
- **Web Connections:**
 - <http://www.ph.ucla.edu/epi/snow.html>
 - <http://www.cdc.gov/ncidod/eid/index.htm>
 - http://www.epidemiology.tulane.edu/broad_street.htm