

Black Death and HIV/AIDS



Critical Challenge

Critical question Which is worse: Black Death or HIV/AIDS?

Overview In this challenge, students compare the effects of the Black Death of the Middle Ages to the HIV/AIDS epidemic. Students begin by studying the preventive measures and treatment attempted, and the physical, social and economic effects of the bubonic plague. As an introduction to the growth potential of diseases, including modern diseases, students take part in a scientific experiment where one student “infects” almost the entire class simply by having everyone exchange liquids with three others. This experiment on exponential growth leads to the study of HIV/AIDS. Supplementing supplied briefing materials with independent print and electronic research, students learn about the nature and effects of HIV/AIDS. In the critical challenge, students decide which disease is more devastating—the Black Death or HIV/AIDS. As an extension, students create a poster representing one lesson they have learned about the disease(s).

Objectives

Broad understanding Readily transmittable diseases, such as the bubonic plague during the Middle Ages and HIV/AIDS in modern times, can have devastating human, economic, political and social effects.

Requisite tools

Background knowledge

- basic knowledge of Black Death and HIV/AIDS (origins, causes, physical effects, treatments, preventive measures, social and economic effects)
- understanding of exponential growth



Criteria for judgment

- criteria for destructive effects (e.g., difficulties in control, physical, social and economic effects)



Critical thinking vocabulary



Thinking strategies



Habits of mind

- empathy



Suggested Activities

Assemble materials for experiment

Pre-planning

- In Session Two, we propose a demonstration of how quickly diseases can spread—even those requiring exchange of fluids. This requires providing one glass for every student—all but one of which are half-filled with water; the remaining glass is half-filled with a clear low concentrate acid. This acid can easily be obtained from the chemistry teacher. In addition, you will need red cabbage juice to serve as an acid indicator. This can be made by boiling some red cabbage in a non-metallic vessel (e.g., glass, Corning ware). Alternatively, let red cabbage soak in hot water overnight. The red cabbage juice should look dark purple (Source: <http://www.cheminst.ca/ncw/experiments/eredcabb.html>).

Study about HIV/AIDS

- It is likely that students will have many questions, and perhaps also misconceptions, about HIV/AIDS. You may want to familiarize yourself with the briefing sheets we provided and with some of the interest sources listed in References, to help you respond to students' comments.
- Decide in advance whether you will allocate roles or allow students to select their own. We have assumed that students will work in pairs on this project. Encourage those students who want to focus on the same role to work together. Although it is not optimal, consider allowing more than one pair of students to research the same role. A significant limitation on students' choices may be availability of resources—especially if an interview is planned.

Session One

Blackline Masters #1–5

Introduce catastrophic diseases

- Ask students to brainstorm some of the world's worst diseases. Students' response will likely include HIV/AIDS, cancer, small pox and influenza. Generate a list of their responses. Discuss why students believe these diseases are among the worst. Typically, students will not think of the Black Death because it is a disease that has little effect on their lives. Some students may have had friends or family members die from HIV/AIDS or cancer, but not Black Death.

Discuss the Black Death

- On an overhead projector place depictions of the victims of the Black Death. Locate these in student textbooks or search <http://images.google.com/> for "Black Death." Briefly explain the origin of the term "Black Death." During the Middle Ages, people termed the illness black death because of the black spots that appeared on their skin. These spots were caused when dried blood under the skin turned a blackish colour. Explain to students that, during the Middle Ages, Asia and Europe were struck by a deadly disease known as the bubonic plague. Between 1347 and 1352, over 25 million people were killed in Europe as a result of the plague. Draw the comparison between the death toll of this plague and Canada's current population.

Create base groups

➤ Divide students into groups of four (base groups). Distribute a different briefing sheet to each student in the group on one of the following aspects of the Black Death in Europe:

- *Physical effects* (Blackline Master #1A–B);
- *Prevention and treatment* (Blackline Master #2);
- *Social and cultural effects* (Blackline Master #3A–B);
- *Economic and political effects* (Blackline Master #4).

Physical effects of the Black Death Blackline Master #1A

Forms of the disease
Modern scientists believe that the Black Death was actually bubonic plague—a disease which afflicts some wild rodents. The cause of the plague is a bacterium called *Yersinia pestis* named after Alexandre Yersin, a Swiss scientist who isolated it in 1894 and developed a serum against it. The disease can be transferred to humans by fleas which live on the rats. The rats and fleas and *Yersinia* bacteria—and, of course, the rats and fleas rarely get close enough to humans for the fleas to transfer the disease called “bubonic” because the bacteria move into the lymph nodes and there create egg-shaped lumps, the deadly “buboes,” in the groin or armpits of its victims. Bubonic plague has, over the centuries, occurred in many places in the world. It is believed by some that it reached what we now call Europe about 1345, carried by a Genoese ship from Kaffa, a city on the Black Sea. A recent recurrence of bubonic plague occurred in India in 1994.

Bubonic plague usually results in death. Today, we have drugs that can cure it if they are administered in time. However, if the victim is already at risk, though malnutrition or other illness, it is more deadly. Even so, historians are puzzled why so many died during the 1348 outbreak. One best guess is that there was more than one variety of plague at work in Europe. There are two other varieties of plague: one which attacks the lungs, and the other which attacks the lungs. The latter is especially dangerous as it can be transmitted through the air. It seems likely that some form of pneumonic plague was at work alongside the bubonic plague in those awful years.

Historical account of the plague
This account is from the city of Messina, and it describes the arrival and initial progress of the disease.
As the beginning of October, in...1347, twelve Genoese galleys...entered the harbor of Messina. In their boats they bore so virulent a disease that anyone who only spoke to them was stricken by mortal illness and in no time could make death. The infection spread to everyone who had any contact with the diseased. Those who fell felt themselves penetrated by a pain throughout their whole bodies and, at to say,

Not only all those who had speech with them died, but also those who had touched or used any of their things. When the inhabitants of Messina discovered that this sudden death emanated from the Genoese ships they hurriedly ordered them out of the harbor and town. But the crew remained and carried a fearful outbreak of death. As the number of deaths increased in Messina many desired to creep to their sites to the streets and to draw up their last will and testament. But ecclesiastics (religious people), lawyers and notaries refused to do any of the duties of the deceased.

Soon the corpses were lying franken in the houses. No ecclesiastic, no son, no father and no relation dared to bury them. The houses of the deceased remained open with their windows, gold and jewels...When the catastrophe emerged, from among the Messinians resolved to the man of Catania. One portion of them resolved to and accompanied them. The disease hung to the help. Many of the fleeing fled down by the seaside and disengaged themselves into the fields and bushes in the These who reached Catania breathed their last in the hospitals there. The terrified citizens would not permit the burials of fugitives from Messina within the town, and so they were all thrown into deep trenches outside the walls.

This the people of Messina dispersed over the whole island of Sicily and with them the disease, in that innumerable people died. The town of Catania lost all its inhabitants, and ultimately sank into complete oblivion. When the plague had attained its height in Catania, the patriarch and emperors, even the young ones, who will all presently powers for the obliteration of sin which he himself possessed as bishop and patriarch. But the pestilence raged from October 1347 to April 1348. The

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knowledge of Black Death

Acquire information in expert groups

➤ Rearrange students into new groups based on their assigned topics (expert groups). In their expert groups, students are responsible for taking notes or highlighting the important ideas of the material provided in the briefing sheets. These students will be expected to teach this material to the members of their base groups. To help them prepare, encourage students to ask questions for clarification and discuss the material with their base group members.

Teach other students

➤ Direct students to return to their base groups where each student will teach the other group members his/her topic. Distribute *Summary of key facts* (Master #5) for students' use in recording the main points on all four aspects of the Black Death.

Discuss student reactions

➤ Once students have been introduced to the four topics, invite them to share their reactions to this disaster. Encourage students to imagine the feelings of people at the time—losing so much to a disease they did not understand and were unable to control.

Summary of key facts Blackline Master #5

Name(s): _____

Black Death HIV/AIDS

Summarize important information from reports by groups on each of the topics below. Add important relevant information obtained from other sources (e.g., book, web sites)

Physical effects

Prevention and treatment
What people first knew or believed _____
What is known today _____

Social effects

Economic effects

Other important effects or information

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empathy



Conduct transmission experiment

- As a powerful way of demonstrating how quickly diseases can spread—even those that require exchange of fluids—ask students to imagine that they have been invited to a party. Distribute half-full glasses of water to all but one student in the class (only you should know this person’s identity). The one student unknowingly is to receive a half-full glass of the low concentrate acid. The idea is that the student with the acid is infected with a communicable disease such as HIV/AIDS. This student will spread the disease to the rest of the class. Be emphatic with students that all the glasses contain a liquid that they are NOT to drink, touch or spill. Explain to students that they must share their liquid with three other students by pouring the contents of their glass into another and then pouring half of that liquid back into their own glass.

Test results

- When everyone has exchanged fluids with three others, test their glasses with an acid indicator (i.e. cabbage juice) to determine which students have been infected. Most of the students will have been infected—their liquids will colour. Explain that only one student’s glass contained an acid mixture while the rest of the glasses contained water. Tell students which student had the acid mixture. Ask students how they think they were infected.

Explain exponential mathematics

- On an overhead projector, use a diagram to demonstrate how easily one person can infect up to 27 people. (One person infects three people; those three people each infect three people, and these nine people infect three people each.) Students should begin to see how easily HIV/AIDS can be spread. Explain to students that this concept is called “exponential growth.”

Introduce study of HIV/AIDS

- Invite students to volunteer what they already know about HIV/AIDS—its transmission, prevention, symptoms and so on. Brainstorm with students similarities between what they already know about HIV/AIDS and Black Death. Generate a list of the similarities and differences on the overhead. Although the actual diseases are different, their effects are quite similar. Some similarities may include the vast scope of death, the destruction of families, and the destruction of economies. Distribute the two background sheets, *HIV/AIDS—a modern plague* (Blackline Master #6)



understanding of exponential growth

HIV/AIDS—a modern plague Blackline Master #6

HIV stands for human immunodeficiency virus. It is a microscopic parasite that can only survive and reproduce inside the cells of a host organism. AIDS stands for acquired immunodeficiency syndrome. It is a weakening of the body's ability to fight off diseases. If HIV gets into a person's blood system, the person may develop AIDS. Then, the epidemic is called "HIV/AIDS." According to the Centers for Disease Control and Prevention:

"HIV is spread by sexual contact with an infected person, by sharing needles and/or syringes (primarily for drug injection) with someone who is infected or, less commonly (and now very rarely in countries where blood is screened for HIV or antibodies), through transfusions of infected blood or blood clotting factors. Babies born to HIV-infected women may become infected before or during birth or through breast-feeding after birth.

HIV/AIDS is a sexually transmitted disease (STD); it can weaken or destroy the body's ability to fight off diseases. Combined antiviral therapy (also called the "drug cocktail") is one of the most important recent advances in treatment of HIV/AIDS, but the treatment is not a cure. No person, once infected, has had HIV/AIDS successfully eliminated from his or her body. The drug cocktail for HIV/AIDS is expensive. There is, at present, no known cure for HIV/AIDS. Experimental trials of vaccines are currently being conducted.

The Center for Disease Control and Prevention reports the following worldwide statistics:

- By the end of 2002, an estimated 42 million people were living with HIV/AIDS. Of these, 3.2 million are children under 15.
- Approximately 5 million people acquired HIV in 2002.
- During 2002, AIDS killed an estimated 3.1 million people, including 1.2 million women and 610,000 children under 15.

Symptoms associated with HIV/AIDS

HIV/AIDS is unlike Black Death in that it acts less like a disease itself and more like a gatekeeper which opens the body of a person to a range of infections. In healthy people, these infections would previously have been prevented by the body's immune system. A great variety of illnesses and symptoms can be indications that a person has HIV/AIDS. Because it can be associated with so many differing symptoms, it took researchers before the existence of HIV/AIDS was generally recognized. As of 1999 about two dozen diseases have been found to be "AIDS-defining"—that is, they are taken as strong indicators of the presence of HIV/AIDS.

Physical and psychological problems associated with HIV/AIDS

People with HIV/AIDS suffer a great range of discomforts:

- painful infections,
- failure of body systems,
- eye infections and sight failures,
- difficulties in swallowing, intestinal pains and failings,
- blood vessel tumors,
- rashes,
- painful swelling of lymph organs,
- dementia (Alzheimer-like decline in mind functions),
- cancers,
- loss of weight, strength and energy,
- great mental stress
- stigma, when people appear to be visibly ill with the disease.

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and *HIV/AIDS in East-central Africa* (Blackline Master #7) to every student. Also distribute a copy of Blackline Master #5 for student use in summarizing the key facts. Ask students to learn more about the parallels between HIV/AIDS and Black Death by reading the two briefing sheets and recording the key facts on Blackline Master #5 for each of the four aspects of the epidemic:

- physical effects;
- prevention and treatment;
- social and cultural effects;
- economic and political effects.

Session Three

Carry out
additional research

- Blackline Masters #6–7 provide an introduction to HIV/AIDS, but students will need to supplement these sources with independent research. Provide students with time in the library and the computer lab to research HIV/AIDS. Check that the websites listed in the References are still accessible, and provide these and others as starting points for students' research. If needed, arrange for an introductory lesson in the library where students can learn to use the Internet more effectively. Remind students to locate and record sufficient information about each of the four aspects of the epidemic.

Session Four

Blackline Master #8

Discuss the
main findings

- When students have completed their research, invite them to share their main facts with the rest of the class. Again discuss the similarities and differences between the Black Death and HIV/AIDS.

Present the
critical challenge

- Distribute *Comparing Black Death and HIV/AIDS* (Blackline Master #8) to every student. You may want to enlarge this chart to ledger size (11 x 17). Present the critical question:

Which is worse: Black Death or HIV/AIDS?



criteria for
devastating
disease

Blackline Master #8

Comparing Black Death and HIV/AIDS

	Black Death	HIV/AIDS	Which is WORSE and why?
Physical Impact			<input type="checkbox"/> Black Death <input type="checkbox"/> HIV/AIDS
Difficulty in prevention and treatment			<input type="checkbox"/> Black Death <input type="checkbox"/> HIV/AIDS
Social and cultural impact			<input type="checkbox"/> Black Death <input type="checkbox"/> HIV/AIDS
Economic and political impact			<input type="checkbox"/> Black Death <input type="checkbox"/> HIV/AIDS

Name: _____

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Debrief
the results

Create a poster

Assess information
and conclusions

Ask students to use the information gathered on the Black Death and HIV/AIDS to help them answer the critical challenge. Explain that the criteria for determining which disease is worse are the extent of impact on each of the four aspects they have been researching. For each of the four criteria, students must rate which disease is worse.

- Invite students to share each of their four conclusions. Encourage students to debate those conclusions upon which they disagree.
- **OPTIONAL:** As a final project, ask students to create a poster that reflects one lesson they have learned while studying Black Death and HIV/AIDS. The posters should not state the lesson learned, but instead imply the lesson through visual representation. For example, instead of simply stating that the spread of the disease is exponential, students would create an image that vividly depicts this phenomenon. A search for Black Death on Google <http://images.google.com/> leads to many contemporary posters and images on the theme. Display the completed posters in the classroom or school hallway. Ask students to determine the lesson represented in each poster.

Evaluation

Blackline Master #9

- Assess students' assembled information about the Black Death and HIV/AIDS as recorded on *Summary of key facts* (Blackline Master #5) and their conclusions about the worst disease as recorded on *Comparing Black Death and HIV/AIDS* (Blackline Master #8). Use the rubric found in *Assessing the effects* (Blackline Master #9). The assignments are worth 10 marks and are assessed on two criteria:
 - coverage of main ideas,
 - support for conclusions.

Name: _____

Use the following rubric to assess the students' summaries of key facts and conclusions about the worse disease. Award intermediate marks for evidence falling between the descriptors.

Blackline Master #9

	Underdeveloped	Competent	Well developed
Coverage of key ideas	Information is vague and few key points are represented.	There is some detailed information but key points are missing in each category.	There is much detailed information and the key points in each category are represented.
Well supported conclusions	The conclusions seem unreasonable and are not supported with relevant evidence.	The conclusions are generally reasonable and are supported with some relevant evidence.	All of the conclusions seem very reasonable and are supported with relevant evidence.
	1	3	5
	1	3	5
	TOTAL		
	/ 10		

Comments: _____

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Extension

- Invite students to plan and implement an HIV/AIDS awareness week campaign. Students can teach their peers about the dangers of HIV/AIDS as well as preventive measures. Encourage students to develop and distribute informational brochures and posters as well as speak at a school assembly or pep rally.

References

Print resources

Huppert, George (1986). *After the Black Death: A Social History of Early Modern Europe*. Bloomington, IN; Indiana University Press.

Nardo, Don (Editor) (1999). *The Black Death*. San Diego, CA: Greenhaven Press.

Picard, Andre (1995). *The Gift of Death: Confronting Canada's Tainted Blood Tragedy*. Toronto: Harper Collins.

Smith, Raymond A. (Ed) (2001). *Encyclopedia of AIDS: A Social, Political, Cultural and Scientific Record of the HIV Epidemic*. London: Penguin Books.

Internet sites

Black Death

[http://www.encarta.msn.com.find.Concise.aspx](http://www.encarta.msn.com/find/Concise.aspx)

<http://www.orb.rhodes.edu/textbooks/westciv/blackdeath.html>

http://www.brown.edu/Departments/Italian_Studies/dweb/plague/

Images of the Black Death can be found at:

http://www.bnf.fr/enluminures/themes/t_3/ast_3_04.htm

http://www.brown.edu/Departments/Italian_Studies/dweb/images/plague/plague_motif.gif

<http://images.google.com/> (Search for "Black Death")

HIV/AIDS

There are numerous Internet sites which focus on HIV/AIDS. Here are the addresses of some:

<http://www.cdcnpin.org/hiv/start.htm>

<http://www.unaids.org/>

<http://www.apa.org/pi/aids/resource.html>

<http://www.aidsinfo.nih.gov/drugs/>

<http://www.pbs.org/newshour/health/aids/index.html>

<http://news.bbc.co.uk/1/hi/world/africa/1679619.stm>

<http://www.pbs.org/newshour/health/aids/index.html>

<http://www.newint.org> *The New Internationalist* on-line back issue on HIV/AIDS (June 2002). Search "Back Issues" for #346.