
Activity Name

HIV/AIDS Through Time

Broad Area of Learning

Health and well-being

Targeted Competency

Competency 2: Makes the most of his/her knowledge of science and technology.

Components of the Targeted Competency

- Puts scientific or technological issues in context
- Understands the scientific principles underlying the issue

Curricular Concepts

- Function of the lymphatic system
- Ways of obtaining active immunity (vaccination and antibodies)
- Vaccine production (biotechnology component)

Grade Level

- Secondary 3 (Grade 9)

Instructional Strategies

- Concept development through the use of information & communication technology (interactive research)
- Articulate scientific concepts
- Place scientific discoveries in local & international contexts

Required Materials

- Student document “HIV/AIDS Through Time”
- Computer or another personal electronic device with an Internet connection (tablet, cell phone, etc.)
- Interactive timeline (see URL link below)

Approximate Duration

- 75 to 90 minutes
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Activity Context and Rationale

The HIV/AIDS epidemic was one of the main concerns of public health authorities in Canada in the 1990s. The advent of combination therapy has enabled HIV-positive individuals to live relatively normal lives with significantly increased life expectancy. However, the seriousness of this disease may not be apparent to younger generations in the West. Yet, even today, there is no medical device other than condoms to prevent transmission of the virus from one infected person to another, and AIDS remains a serious and sometimes fatal disease.

At the same time, statistics show that the sexual behavior of younger generations increases their risk of contracting a life-threatening STBBI. In fact, Health Canada is making the fight against STBBIs a priority because it is aware of the increasing number of infections of gonorrhea and syphilis in the last 10 years. Thus, raising awareness and disseminating information on this subject remains an excellent means of raising public awareness of the consequences of engaging in risky behavior.

The aim of this activity is to raise awareness of HIV/AIDS and its history, from the discovery of the disease to current medical advances and promising treatments. This activity is best carried out at the end of the chapter dealing with the immune system (secondary science and technology program), as several complex concepts are discussed. Moreover, this activity is an excellent way to introduce the biotechnology component, specifically the manufacture of vaccines, which is also included in the Secondary III program. Naturally, the lesson will revisit concepts already covered in Secondary II, including STBBIs, contraception, and the human reproductive system.

Using the interactive timeline, students will answer scientific questions while discussing the importance of raising awareness of HIV/AIDS. The activity is concluded with a group discussion guided by the teacher.

Sequence of Activities

1- Introduction (10-15 minutes)

The teacher questions students about HIV/AIDS in order to activate their prior knowledge. Some suggested group discussion questions are given below. It is important for the teacher to listen carefully to students' answers and be able to clear up any misconceptions with factual information.

1- In your own words, what is AIDS?

AIDS is an STBBI that is contracted through sexual contact or contact with blood, such as the use of a contaminated syringe. This disease makes infected individuals very vulnerable to a wide range of infections.

2- Can AIDS kill?

AIDS can be very deadly. Since the infection began in 1980, it has killed more than 32 million people worldwide.

3- Are there currently any treatments for AIDS?

There are some treatments that slow down the progression of the virus, but it remains deadly for the infected person. However, people living with the disease today have a much longer life expectancy than those infected in the 1990s because of medical advances.

4- Which groups of people are at risk of contracting AIDS?

Anyone who has unprotected sex with a person with AIDS is at risk. However, homosexual men are particularly at risk because irritation during intercourse is higher than in heterosexual intercourse. As well, injecting drug users who share their contaminated needles are also at high risk.

5- Are there any ways of stopping this epidemic?

Individuals who are sexually active and concerned about their sexual health can get tested for HIV and other STBBIs. As well, condom use is effective in preventing the spread of this disease. Finally, raising awareness and disseminating information on the various means of contraception, as well as the AIDS virus and its modes of transmission, can be carried out on a large scale in schools, health institutions, and the general population.

2- Presentation of the timeline by the teacher (5-10 minutes)

Using a projector or other visual aid, the teacher presents the interactive timeline. Students can use it to answer questions about the history of the HIV/AIDS epidemic and its treatments. The teacher should illustrate how to use the interactive timeline by clicking on timeline points as well as the videos. Students can then work in pairs to complete the question sheet using personal computers, tablets, or cell phones.

3- Student work time (30-45 minutes)

*Students will need access to the link provided below. The teacher may find it convenient to e-mail the link to students, post it on a classroom site, or write it on the chalkboard:
<http://www.tiki-toki.com/timeline/entry/761846/HIVAIDS-and-its-treatments-across-time/>

In pairs, students answer questions using the information found on the interactive timeline. During this time, the teacher circulates and assists the students in their research while ensuring the effectiveness of all the teams. The answer key found below includes additional information that can be integrated into the lesson at the discretion of the teacher.

4- Conclusion and extension (10-15 minutes)

The teacher helps students to summarize the activity by asking them about key facts regarding the HIV/AIDS epidemic and its treatments. During this time, the teacher may also choose to include some of the additional information found in the answer key.

Suggested large group questions include:

- 1- After completing this activity, what do you know about the mode of action of the AIDS virus?
- 2- How has the research of the 1990s been important to the continuing fight against AIDS?
- 3- What things did you find surprising in the video presenting the daily life of a person

with AIDS?

4- What are some of the current major challenges in the fight against AIDS?

5- What are the objectives of current research in the fight against AIDS, including glycomics in Canada?

Timeline questionnaire: use this [link](#)

a) In 1982, doctors began calling this disease AIDS.

In order to fully understand this acronym, define the following terms:

1- Syndrome: A set of clinical signs and symptoms that a patient is likely to have in certain diseases

2- Immune system: A group of cells, tissues, and organs that work together to protect the body from foreign “invaders.”

3- Deficient: Something that does not function to its full capacity.

Additional Information

The letter “A” stands for “acquired,” meaning that the disease develops over time as a result of an infection with HIV. A person infected with HIV will remain infectious for the rest of his/her life. In Canada, it is a criminal offence for a person who knowingly carries the virus to deliberately decide not to inform his/her partner.

b) In your opinion, why was the name AIDS chosen for this disease?

AIDS describes what can result from an infection with HIV – cells of the immune system are attacked by the virus, and can no longer protect the body from foreign pathogens. As a result, people with AIDS often die from secondary infections.

c) What is the best way to avoid the transmission of AIDS during intercourse?

Condoms remain the most effective means of preventing transmission of the virus during intercourse.

Additional Information

Despite the fact that some other methods of contraception may be relatively effective against the transmission of STBBIs, including some spermicides, the fact remains that the condom provides a physical barrier that prevents direct contact between both partners. The female condom is also effective in this regard. Other means of contraception, such as the IUD or injections, are used to prevent pregnancy, but do not protect against STBBIs.

d) Summarize the content of the video in section 3 in a few sentences.

The AIDS virus infects our white blood cells (lymphocytes), whose role is to defend us against foreign pathogens. The countries most affected by AIDS are located in Africa and Asia. The rate of infected people, who are said to be seropositive, can be as high as 25% in some countries. There is no HIV vaccine yet, but only drugs that slow down the progression of the virus. Encouraging condom use to avoid transmission of the virus is important in developing countries.

e) What symbol is used to raise awareness of HIV/AIDS?

Since 1991, a red ribbon has been used to raise awareness of this disease.

Additional Information

It was during the Gulf War that an American painter by the name of Franck More proposed using a red ribbon, a symbol of hope, in support of the 130,000 people who had died of AIDS at that time. Red refers to blood, while the shape of the infinite, but cut, ribbon symbolizes hope for the cycle of the disease to end.

f) In the 1990s, AIDS researchers found it difficult to raise funds for their studies, particularly because the disease was thought to be specific to homosexuals, injecting drug users, and prostitutes. These beliefs were ultimately shown to be false. How would you prioritize research funding to AIDS in relation to other diseases such as cancer, cardiovascular disease or diabetes?

(Answers will vary) Funding for AIDS research has resulted in longer lifespans and improved quality of life for people of all walks of life in many parts of the world, although the disease continues to wreak havoc in Africa and parts of Asia. Aside from new treatments, funding for AIDS research has also been critical for developing public health measures and awareness campaigns.

g) What social factors do you think explain the fact that the number of AIDS cases in Africa and Asia has continued to increase in the 2000s, while the epidemic is losing momentum in Western countries?

Condom use is not as widespread in many of these areas, for a variety of cultural and religious reasons. As well, high costs are a barrier to accessible treatment options, and a

lack of education about virus transmission still persists. Sexuality in general remains a more taboo topic in this area of the world.

Additional Information

The Catholic Church remains opposed to contraception, despite a greater openness on the part of Pope Francis in 2015. In 2009, Pope Benedict XVI sowed the controversy among the scientific community by saying that AIDS "... cannot be overcome through the distribution of condoms, which even aggravates the problems." He finally retracted the statement a year later.

h) After watching the video describing the daily lives of Canadians affected by AIDS, how would you describe their quality of life?

The subject seems to live relatively normally. He must regularly visit the hospital for blood tests to determine the status of his disease, and also take a large number of medications every day.

i) In many Western countries, such as Canada, combination therapy costs are covered by different insurance programs. Bearing in mind the various stakeholders (government, insurance companies, patient, etc.), how should these expensive treatments be paid for?

(Answers will vary) Students may indicate that some form of health insurance is necessary, as most affected individuals won't be able to pay for treatment out of pocket. Cost-sharing between the various stakeholders could also be discussed.

j) What are the main challenges facing African and Asian countries in their fight against HIV/AIDS?

Conservative cultural values in many countries can result in a rejection of condom use. Challenges also exist in communication and education, impeding public health awareness. Individuals with AIDS may not be able to afford combination therapy, as many countries don't offer insurance. Improving awareness therefore becomes exceedingly important to overcoming this disease.

k) Can the field of glycomics, the study of carbohydrate structures and their role in health & disease, have any advantages in the fight against HIV/AIDS?

Using very simple and cheap molecules, such as sugars, as the starting materials for new drugs could help to lower the cost of new medications. A lower production cost will allow more people to have access to treatment, especially in poor countries.

Additional Information

The development of inexpensive yet effective carbohydrate-based medications has proved its worth in recent years. Glycomics has made it possible to develop vaccines, in particular against influenza and pneumonia, which can be produced relatively inexpensively. Promising research is currently under way at universities such as Université Laval to combat viral infections, including hepatitis A.

As you have seen through the timeline and the present questionnaire, the fight against AIDS is certainly not over. Dealing with the complexity of the AIDS virus is a challenge for researchers in their fight against this deadly disease. Several avenues of research are under investigation, including preventing the virus from reaching human cells, preventing mutation of the virus, and decreasing the viral load. Additionally, improving the accessibility of treatments in different regions of the world remains an important goal.

l) Based on the timeline information and information from other sources, why is it a good idea for many researchers to pursue HIV/AIDS related research?

When multiple laboratories investigate different treatments against this terrible disease, the chances of obtaining an effective treatment are greater. Although some research will prove ineffective in the end, every well-designed study can help increase our level of knowledge about HIV/AIDS and its possible treatments.

m) By conducting a quick Internet search, why is it so difficult to develop a vaccine against AIDS?

The AIDS virus regularly alters its surface components, making it difficult for the immune system to recognize the virus. Frequent mutations prevent antibodies from being generated in numbers sufficient to fight the infection. For this reason, researchers are developing strategies to allow for better recognition of the virus by our immune system.

Additional Information

The origin of HIV is not known precisely, and several different theories exist. One possibility is that the virus originally infected primates, then mutated into a form that allows it to infect humans. It is known, however, that the disease first appeared in Africa.

n) To advance a field of research, it is important that discoveries made in laboratories such as l'Université Laval in Québec City are made available to researchers around the world. What challenges do you think researchers experience with sharing information?

Research publications communicate results between different laboratories, allowing scientists to build on each other's findings, although access to these publications can be very expensive. However, labs working in the same area are often in competition with each other to make great discoveries, as well as the prestige and research dollars that come along with those discoveries.

o) How can advances in the medical and scientific fields be shared throughout the world?

Researchers who make significant advances can publish articles about their work in recognized scientific journals. These articles share new discoveries with the scientific community while giving credit to the researchers who carried out the work. In addition, researchers can participate in conferences with their fellow scientists, where they will share their research results and discuss new developments in their field.

p) Did any parts of this activity surprise you? Why?

(Answers will vary)