

Title: HIV on the Run

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Key Questions: What is HIV? What is AIDS? What is a Retrovirus? How does the HIV virus replicate? How does HIV affect your immune system? What are the similarities/differences between HIV-1 and HIV-2? What are the social impacts of being HIV positive? How is HIV transmitted? What are several fallacies regarding HIV? What is a viral load? What is a protease inhibitor? What is the Omnibus AIDS Act?

Science Subject: Health Science II and Certified Nursing Assistant

Grade Level: 11th and 12th grade Honors

Science Concepts: SC.912.L.14.6 Explain the significance of genetic factors, environmental factors, and pathogenic agents to health from the perspectives of both individual and public health.

STUDENT LEARNING OBJECTIVES WITH STANDARDS:

15.0 Demonstrate knowledge of blood borne diseases, including HIV/AIDS. – The student will be able to:

- 15.01 Recognize emerging diseases and disorders.
- 15.02 Distinguish between fact and fallacy about the transmission and treatment of diseases caused by blood borne pathogens including Hepatitis B.
- 15.03 Identify "at risk" behaviors that promote the spread of diseases caused by blood borne pathogens and the public education necessary to combat the spread of these diseases.
- 15.04 Identify community resources and services available to the individuals with diseases caused by blood borne pathogens.
- 15.05 Apply infection control techniques designed to prevent the spread of diseases caused by blood borne pathogens to the care of all patients following Centers for Disease Control (CDC) guidelines.
- 15.06 Demonstrate knowledge of the legal aspects of HIV/AIDS, including testing.

This standard supports the following Next Generation Sunshine State Standards:

[SC.912.L.14.6,14.52; MA,.912.D.6.4.6.6;MA.912.P.2.1,2.3;HE.912.P.2.1; HE.912.B.1.4 ;HE.912.C.1.1, 1.5, 1.6, 1.7, 1.8, 2.2, 2.7, and 2.8]

Materials:

1. Classroom set of Dell computers or use of portable computer lab from media center
2. Teachers copy of Viral Quest CD
3. AIDS - ELISA simulation kits from Flinn Scientific
4. Teacher's san cruiser

Procedures and Discussion Questions with Time Estimates:

Week one:

1. Day one:
 - a. Pass out pretest, ask students to write on the test. Please make sure their name is on it before collecting.
 - b. Meet the microbe's activity: divide the class into two even groups.
 - i. Give every student in group A one of the strips labeled questions.
 - ii. Give everyone in group B one of the strips labeled answers.
 - iii. Allow the students to intermingle to match up the correct questions and answers.
 - iv. Once students match up, have them go collect the plush microbe they think they are.
 - v. You will check to see if they are correct looking inside of the plush microbes' card, it should match their question/answer strips.
 - c. After activity, ask students which of the microbes are the biggest threat to humans. Please utilize a round robin approach.
 - d. Tell students to review notes nightly
2. Day two:
 - a. Pass out worksheet "Virus notes"
 - b. Put in the teacher's copy CD of Viral Quest, pull up the power point "viruses"
 - c. Have students complete the work sheet as you play the power point.
 - d. Have students turn over the worksheet and answer the following questions
 - i. What is the relationship between the immune system and viral infections?
 - ii. How does this complicate finding a cure for AIDS?
 - e. Tell students to review notes nightly
3. Day three:
 - a. Pass out "Viral News " worksheet
 - b. Divide class into 5 equal groups and assign each group to a computer station.
 - c. Assign each group 2 of the 10 websites provided. Each group is to fill in as much of the worksheet as possible from the 2 websites assigned to them only.
 - d. After 10 minutes combine groups 1, 2, and 3 people from group 3. Combine group 4, 5, and remaining 3 people from group 3. Have them try to fill in the rest of the worksheet.
 - e. After 10 minutes regroup by having group 1 and 5 change places.
 - f. Tell students to review notes nightly

4. Day four:
 - a. Insert teacher's san cruzer into computer and open power point HIV
 - b. Have students take notes, students will be quizzed daily on the previous day's lecture.
 - c. Start at the evolution of HIV and stop at the end of the life cycle/replication of HIV.
 - d. Tell students to review notes nightly

5. Day five:
 - a. Pass out quiz one; allow 10 minutes for students to complete before collecting.
 - b. Start power point where you left off yesterday. Today go over fallacies, myths, epidemiology and the transmission of HIV.
 - c. Remind students of quiz tomorrow.

6. Day six:
 - a. Pass out quiz two; allow 10 minutes for students to complete before collecting.
 - b. Start power point where you left off yesterday. Today go over prevention, testing, and stages of HIV.
 - c. Remind students of quiz tomorrow.

7. Day seven:
 - a. Pass out quiz three; allow 10 minutes for students to complete before collecting.
 - b. Start power point where you left off yesterday. Today go over biochemistry and legal issues of HIV.
 - c. Remind students of quiz tomorrow

8. Day eight:
 - a. Pass out quiz four; allow 10 minutes for students to complete before collecting.
 - b. Divide students into groups of two
 - c. Give each group a set of instructions, a 96 well micropipette, 2 vials of different colored water, one micropipette.
 - d. Students are to read and follow directions to create a design in their wells.
 - e. Assign students to watch "ELISA testing" with Linda Green at <http://cpet.ufl.edu/EIS/elisa/index.htm> for homework.
 - f. Tell students to review notes nightly

9. Day nine:
 - a. Divide students into groups of 2-3.

- b. Give each group an AIDS-ELISA simulation kit
- c. Have students follow directions and complete the worksheet in the kit.
- d. Remind students of test tomorrow.

10. Day ten:

- a. Pass out post test
- b. Students have the entire period to complete.

Assessment Suggestions:

1. 15.01 Recognize emerging diseases and disorders.
 - a. Pre-test and Post-test
 - b. Students used different types of media to learn about the social, cultural, and economical implications blood borne diseases.
2. 15.02 Distinguish between fact and fallacy about the transmission and treatment of diseases caused by blood borne pathogens including Hepatitis B.
 - a. Pre-test and Post-test
 - b. Take notes from power point
 - c. Answer questions on daily quizzes
 - d. Using Viral Quest students will have taken notes from lesson two that enable them to answer worksheet questions regarding the process by which viruses reproduce and the structural differences between DNA and RNA. After completing lesson three and collaborating together through a jigsaw activity, students will be able to describe how HIV affects individuals and society by filling out a worksheet correctly.
3. 15.03 Identify "at risk" behaviors that promote the spread of diseases caused by blood borne pathogens and the public education necessary to combat the spread of these diseases.
 - a. Pre-test and Post-test
 - b. Take notes from power point
 - c. Answer questions on daily quizzes
4. 15.04 Identify community resources and services available to the individuals with diseases caused by blood borne pathogens.
 - a. Pre-test and Post-test
 - b. Take notes from power point
 - c. Answer questions on daily quizzes
5. 15.05 Apply infection control techniques designed to prevent the spread of diseases caused by blood borne pathogens to the care of all patients following Centers for Disease Control (CDC) guidelines.
 - a. Pre-test and Post-test
 - b. Take notes from power point
 - c. Answer questions on daily quizzes

6. 15.06 Demonstrate knowledge of the legal aspects of HIV/AIDS, including testing.
 - a. Pre-test and Post-test
 - b. Take notes from power point
 - c. Answer questions on daily quizzes
 - d. Students completed an ELISA simulation in which they portrayed lab technicians and were able to fill out the proper laboratory forms correctly having utilized Dr. Lawrence's manual as a reference.
 - e. Students could identify all six components of the AIDS OMNIBUS ACT.

RESOURCES/REFERENCES:

"The Evolution of HIV" lecture June 21, 2011 Emerging Pathogen Building Room 150. Dr. Marco Salemi, Associate Professor, Department of Pathology, Immunology, and Laboratory Medicine/Emerging Pathogens Institute.

"Biochemistry of HIV Drugs" lecture June 21, 2011 ICBR Teaching Laboratory, Cancer and Genetics Building. Dr. Ben Dunn, Distinguished Professor, Department of Biochemistry and Molecular Biology.

"ELISA" lecture June 21, 2011 ICBR Teaching Laboratory, Cancer and Genetics Building. Dr. Charles Lawrence, UF CPET Educational, Multimedia & Web Designer

"ELISA testing" with Linda Green. Center for Precollegiate Education and Training, Excursions in Science. <http://cpet.ufl.edu/EIS/elisa/index.htm>

Klosterman M, Sadler T, Brown J. 2011. Viral Quest Teacher Guide University of Florida College of Education

Klosterman M, Sadler T, Brown J. 2011. Viral Quest CD-ROM University of Florida College of Education

HIV prevalence map retrieved from:

http://www.unaids.org/globalreport/HIV_prevalence_map.htm June 23, 2011

HIV Facts. (n.d.). Retrieved from <http://www.cdc.gov/hiv/default.htm> June 23, 2011

Drexler, M. (2011). *What You Need To Know About Infectious Diseases*. Washington DC: National Academy of Science.

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Abstract: This action plan is designed to incorporate some of the biotechnical aspects of HIV that I have learned here at ICORE into my health class. This is a little daunting due to the fact that as health care professionals, we are always looking for the end product but sometimes we fail to understand or recognize how we got there. Each person has a unique role and rarely crosses that line. I want my students to cross that line and look for ways to collaborate. Health science II students will increase their knowledge of blood borne diseases, including HIV/AIDS by being provided excerpts from several different lectures I attended here at ICORE to try to understand the evolution of HIV, the biochemistry of HIV drugs, and the rationale of using the ELISA for detection of antibody-antigen reactions. Students will also utilize Viral Quest as an additional tool for information to demonstrate the use of information technology tools.

Rationale: Health Science classes must be able demonstrate knowledge of blood borne diseases with particular attention to following all protocols for safety from the Occupational Safety and Health Administration and the Centers for Disease Control. The school's agreement with several local hospitals, pharmacies, and nursing homes states that our students will meet the industries standards in all content relating to infection control and blood borne diseases, therefore my business partners demand that my students pass an examination on HIV/AIDS with an eighty five percent or higher in order to job shadow in their establishments.

Description of teaching unit with expected outcomes: This unit will require two weeks to complete beginning with a pretest followed by a teacher directed instruction on HIV, and several teacher/student directed lab activities.

Day 1: Pretest & Meeting the Microbes

Before the lesson: Students will understand the basic concepts of infection control. Students will know the differences between different types of microbes such as; bacteria, virus, rickettsia, fungi, and protozoa. They will be able to identify and follow Standard and Transmission-Based Precautions.

Pretest to assess HIV background knowledge of students. We will then utilize the microbe equipment locker from CPET as an introduction to emerging pathogens in today's society. Students will have either a question or an answer to a specific pathogen.

Assessment: Students will correctly match their questions and answers. After the activity students will physically arrange themselves in a line, with their microbes, according to the microbe's threat level to humans. After their lineup we will have a round robin discussion on why these microbes are the biggest threats to us.

Day 2-3: Viral Quest Component Lessons two & three (available from Dr.Sadler, University of Florida College of Education)

Before the lesson: Students will be able to demonstrate basic computer skills and employ those skills to solve problems and make decisions while recognizing HIV as an emergent disease.

Assessment: Students will have taken notes from lesson two that enable them to answer worksheet questions regarding the process by which viruses reproduce and the structural differences between DNA and RNA. After completing lesson three and collaborating together through a jigsaw activity, students will be able to describe how HIV affects individuals and society by filling out a worksheet correctly.

Day 4-7: PowerPoint Presentation on HIV

Power Point Presentation containing lecture information specific to HIV obtained from CPET professional development. Students will take daily notes.

Assessment will be done by daily quizzes on the previous day's material.

Day 4: Material covered will include information from Dr. Marco Salemi's presentation "The Evolution of HIV". It will also include information on the prevalence of HIV, the life cycle of the virus and replication. Video showing the HIV life cycle will be utilized.

Day 5: Material covered will include information on epidemiology and the transmission of HIV. Video showing the US AIDS epidemic from 1981-1997 will be shown.

Day 6: Material covered will include information on prevention of HIV, testing for HIV, and the stages of HIV.

Day 7: Material covered will include information from Dr. Ben Dunn's presentation "Biochemistry of HIV Drugs". It will also include legal issues related to HIV.

Day 8: Micro-Pipetting by Coordinates Lab to learn proper use of biotechnical equipment.

Students will be given a set of instructions and a 96 well microplate. Students will read directions and accurately micro-pipette colored solutions into the 96 well microplate to make a rainbow.

Assessment: Successful following of directions and accurate Pipetting skills will result in a design recognizable on the microplate to students and teacher.

Day 9: ELISA Lab to apply theory application to practical application.

Before the lesson: Students will have watched "ELISA testing" with Linda Green at <http://cpet.ufl.edu/EIS/elisa/index.htm> the previous night for background knowledge.

Students will perform a simulated ELISA on patients for detection of the HIV-1 virus. Students will utilize the manual from Dr. Charles Lawrence of CPET to perform the lab.

Assessment: Students will portray lab technicians and will be able to fill out the proper laboratory forms correctly having utilized Dr. Lawrence's manual as a reference.

Day 10: Post test.

Assessment: Students will make an 85% or higher to demonstrate mastery of HIV content.

Data Collection techniques/student assessments:

Pre and Post tests

Quizzes

Worksheets

Use of equipment lockers:

Microbes

Pipettes

ELISA

UF ICORE Connections:

"The Evolution of HIV" lecture June 21, 2011 Emerging Pathogen Building Room 150. Dr. Marco Salemi, Associate Professor, Department of Pathology, Immunology, and Laboratory Medicine/Emerging Pathogens Institute.

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"ELISA testing" with Linda Green. Center for Precollegiate Education and Training, Excursions in Science. <http://cpet.ufl.edu/EIS/elisa/index.htm>

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Klosterman M, Sadler T, Brown J. 2011. Viral Quest CD-ROM University of Florida College of Education

HIV Life Cycle. Howard Hughes Medical Institute. Holiday Lecture on Science, Dec. 2007. DVD.

US AIDS Epidemic. Howard Hughes Medical Institute. Holiday Lecture on Science, Dec. 2007. DVD.

Literature cited:

HIV prevalence map retrieved from:

http://www.unaids.org/globalreport/HIV_prevalence_map.htm June 23, 2011

HIV Facts. (n.d.). Retrieved from <http://www.cdc.gov/hiv/default.htm> June 23, 2011

Budget:

Flinn Scientific Aids Stimulation Kits FB1572

\$51.25 x4=\$205.00 +shipping & handling