The Ebola Epidemic

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High School

Abstract: This activity will be used to introduce beginning level biology students to the Ebola outbreak of 2014 and allow them to use the skills they learned throughout the unit to make a plan to contain the disease. They will have to use what they learned throughout the human immune system unit to be able to answer questions about aiding specific and non-specific immune responses and comparing their own plans with how it was actually stopped. This will let them go through the scientific method and look at a real world case study.

Rationale: This assignment will target 9th and 10th grade students in a biology course at the regular, honors, and pre- A.I.C.E level. All students are required to take this course per the state. Students come in with different levels of prior knowledge and interest. When they get to this lesson, students will have already learned how the human body defends itself and keeps us healthy. They should have a strong background in vaccines and an introduction to mutations. They will also be familiar with the scientific method and will have to combine their knowledge of the body with the practical application of the scientific method.

"The Ebola Epidemic" will give the students a brief introduction to the Ebola problem and how it impacts the body. They will have to gain knowledge individually and then use that knowledge to contribute to a group design. As an extension for the higher level students they will be asked to compare where their plan differs from how the epidemic was actually stopped. They will have to show differences in their thinking vs. the actual plan implemented.

Description of teaching unit or module(s), including expected outcomes:

This activity will only take a day to do but will fall at the end of a 10 day unit that covers the question "How does my body keep me healthy?" This unit will cover the following standards:

SC.912.L.14.52
SC.912.L.14.6
SC.912.L.16.10
SC.912.N.1.1

Students should be able to use the things they learned from these standards and apply them to a real life situation. They will be able to produce a cohesive action plan to stop Ebola and show how various stages of the disease are impacted by their plan.

Data collection techniques and/or student assessments:

Students will be responsible for turning in a group copy of the associated worksheet. They will have to have their questions answered as well as their plan written out in an acceptable format.

ICORE summer institute elements specifically included (UF connections):

•Information from the "Ebola Epidemic" activity (the information sheets)

LESSON PLAN Jesse Jecusco

TITLE: The Ebola Epidemic

KEY QUESTION: How would you stop the Ebola epidemic using your knowledge of the immune system and the scientific method?

SCIENCE SUBJECT: Biology

GRADE AND ABILITY LEVEL: 9^{th} through 12^{th} all levels.

SCIENCE CONCEPTS: Identify key impacts of disease on immune system and apply knowledge to create an action plan.

OVERALL TIME ESTIMATE:

50 minute class period

LEARNING STYLES: Visual, auditory, and synthesis

VOCABULARY

- Ebola
- Epidemic
- Non-Specific Immune Response
- Vaccine
- Specific Immune Response

LESSON SUMMARY:

In this lesson students will watch a short video explaining the Ebola outbreak of 2014 in West Africa. Then will then get four sheets of information and each person at the table will be responsible for learning 1 of the sheets. The four topics are: General Information, Illness and Symptoms, Sources of infection and Risk Factors, and Diagnosis and Detection. After they have been given time to read their sheet students will work as a group to answer the questions and devise their own action plan to contain and stop the spread of the virus.

STUDENT LEARNING OBJECTIVES WITH STANDARDS:

1. The student will be able to predict how a change can impact both specific and non-specific immune responses (SC.912.L.14.52- Immune System) 2. The students will show an understanding of the Ebola outbreak and how changes they make can impact the disease and the spread of the epidemic (SC.912.L.14.6- Pathogenic Agents) 3.) Students will be able to choose to use a biotechnology (vaccines) and predict how the population will be impacted by its distribution (SC.912.L.16.10- Biotechnology and its impacts) 4.) Use the scientific method to devise an action plan to stop the spread of ebola (SC.912.N.1.1- Scientific method)

MATERIALS:

ESSENTIAL:

1 computer per student to access the worksheet (or printed versions)

PROCEDURE AND DISCUSSION QUESTIONS WITH TIME ESTIMATES: ~45 minutes

Watch the first 4 minutes or so of this video. Stop it before it talks about prevention so they can figure out their own ideas.

Students will then read one of the 4 pages provided on the sheet (each group will have one person that reads each sheet). They will then work together to read the following scenario and answer the following questions:

In 2014 there was a massive outbreak of Ebola in West Africa. You and your table area team of experts who have been flown in to help stop the spread. Using what you know about our immune system and the sheets you just read come up with a plan to stop the spread of Ebola. You must answer the following questions as a group and at the end write a paragraph to summarize how you would stop the spread.

What is one way to help a non-specific immune response fight Ebola?

What is one way to help a specific immune response fight Ebola?

What would you do with someone who is infected?

What would you do with someone who has died?

How would you protect those who have not yet been infected?

What would you do to educate the population about the risk of Ebola?

Write your plan here:

ASSESSMENT SUGGESTIONS:

Students should be assessed on how well they answered the guiding questions and by how comprehensive their plan is to stop Ebola. It should cover all of their known risk factors and use information from the immune system unit.

EXTENSIONS:

Additional question:

After watching this video answer the following question:

Individually you will now need to compare your action plan to the one actually used to stop the infection. In what ways was your action plan similar? In what ways was it different? How could a mutation in the existing strain impact future efforts?

ACTION PLAN

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ABSTRACT

- Students will learn about 2014 Ebola outbreak
- They will learn about the disease as a group and individually
- They will come up with a plan to control the outbreak using their knowledge of the immune system and biotechnology.
- Extension activities will involve comparing student plans with actual control plans

RATIONALE

- Students will have already had most of a unit on immune system
  - Specific immune response
  - Non-specific immune response
  - Vaccines
  - Mutation
- This will allow students to use a group setting to apply knowledge about a subject in a deeper way
- It combines some aspects of what we learned this week with the standards and timeline the district has laid out.

OVERVIEW

- Students will first watch a short video on the Ebola outbreak of 2014

- They will then each have a paper to read covering different topics
  - General Information
  - Illness and Symptoms
  - Sources of Infection and Risk Factors
  - Diagnosis and Detection
- The students will then have to answer leading questions and eventually come up with how to stop the spread of Ebola

LEADING QUESTIONS

- What is one way to help a non-specific immune response fight Ebola?
- What is one way to help a specific immune response fight Ebola?
- What would you do with someone who is infected?
- What would you do with someone who has died?
- How would you protect those who have not yet been infected?
- What would you do to educate the population about the risk of Ebola?