

Flu and You: A Study of the H1N1 Pandemic

Charleen Kelley
Columbia High School

Mission Statement:

Students use biotechnology techniques to understand an emerging pathogen: its origin, spread, and treatment. “Real World” experience will be gained by studying the H1N1 pandemic of 2009. Students share knowledge with the community by making posters, pamphlets, or presentation. These will include general information on H1N1 and tips to prevent the spread among school children. In-service will be given to high school teachers on emerging pathogens.

Abstract:

Students use biotechnology to better understand the concept of emerging pathogen. They study the nature of proteins and their uses inside the human body. Hands on lab activities are used to discover characteristics of protein structure. These labs include: the study of enzyme action, antigen, antibody reactions, and Elisa. The structures of DNA and RNA are studied. Labs include: DNA extraction, restriction enzyme simulation, and DNA

e-gel. Students do a case study of the H1N1 pandemic of 2009. The study involves charting the spread of flu during the fall of 2009. Outreach in the community includes pamphlets and presentations that describe flu and ways to prevent the spread .In-service will be given to high school teachers on emerging pathogens.

Description of unit or module:

Developing background knowledge:

The unit begins with study of protein structure. Students perform three lab activities related to proteins.

Lab 1 Enzyme Action- cheese making. Students place milk at room temperature and compare the curdling time with and without the enzyme.

Lab 2- is the Antigen/ antibody reaction. Students relate this lab to the body’s immune response system.

Lab 3 Elisa Immuno Explorer kit

Next students study structure/ function of DNA and RNA. During this time, they do the following three labs:

1. DNA extraction
2. DNA restriction enzymes activity
3. DNA e-gel lab

The final section includes emerging pathogens. Students use their knowledge of protein structure, DNA, and RNA to understand virus function. They define emerging pathogen and study the history of flu outbreaks around the globe. The study includes H1N1 virus: history and how it jumped to humans. Students go to the CDC website to track the

location and numbers of flu outbreaks during the year. They learn characteristics of the most prevalent strains. Students write a pamphlet, go online to write a Picture story or make a poster. These are used in elementary schools to teach children how to prevent the spread of flu.

Expertise:

Charleen Kelley

Graduate University of Florida, Bachelors degree 1969.

Master's Degree in Curriculum and Instruction 1979

National Board Certification AYA, 2003

FRI training 2007

Reading Endorsed 2009

CPET Environmental Health Program 2003

ICORE Emerging Pathogen Workshop 2009

Science Department Chair- Columbia High

Science Teacher 32 years

References:

"Bench To Bedside: and Everything In-Between": Tammy Mandell, CERHB, University of Florida, 2009.

Biotechnology: University of Florida, 2009.

"How Do Viruses Change Their Coats to Fit A New Host?", Mavis McKenna and Robert McKenna, University of Florida, Gainesville, Florida, 2009

Budget:

Bus/substitute \$150

Elisa Immuno Explorer kit \$99

Micropipette \$200

Use of U. F. lockers

Culminating trip to U.F. labs

Lesson Plan- Flu and You: A Study of the H1N1 Pandemic

Charleen Kelley
Columbia High School

Objective:

Students: Students use biotechnology techniques to understand an emerging pathogen: its origin, spread, and treatment. “Real World” experience will be gained by studying the H1N1 pandemic of 2009.

Building background knowledge:

Developing background knowledge:

The unit begins with study of protein structure. Students perform three lab activities related to proteins.

Lab 1 Enzyme Action- cheese making. Students place milk at room temperature and compare the curdling time with and without the enzyme.

Lab 2- is the Antigen/ antibody reaction. Students relate this lab to the body’s immune response system.

Lab 3 Elisa Immuno Explorer kit

Next students study structure/ function of DNA and RNA. During this time, they do the following three labs:

4. DNA extraction
5. DNA restriction enzymes activity
6. DNA e-gel lab

The final section includes emerging pathogens. Students use their knowledge of protein structure, DNA, and RNA to understand virus function. They define emerging pathogen and study the history of flu outbreaks around the globe. The study includes H1N1 virus: history and how it jumped to humans. Students go to the CDC website to track the location and numbers of flu outbreaks during the year. They learn characteristics of the most prevalent strains. Students write a pamphlet, go online to write a Picture story or make a poster.

Emerging pathogen: H1N1 Unit:

I. Students are given a pre-test to assess their knowledge of H1N1. These are given in sections with an example of the first included:

1. H1N1 is the following type of virus (circle answer)

RNA

DNA

2. H1N1 has _____ genome strands.

3. H1N1 is a combination of the following three types of flu:

4. Define emerging pathogen.

5. What is a pandemic?

III. There is a class discussion about what students already know on H1N1- all responses are placed on the board. These comments are left on the board during the PowerPoint presentation that follows.

IV. Students are shown the PowerPoint presentation: Emerging Pathogens, Pandemics and Other Things That Go Bump in the Night by Dr. Glenn Morris.

- Students take notes during the PowerPoint Presentation.
- After the presentations students look back at the list they previously compiled on the board. Any incorrect information is marked off and additional information is added.

4. CDC News articles: Students go the CDC website and compile articles on H1N1. Teacher provides the following CDC articles for students to read:

Novel H1N1 Influenza Vaccine

Novel H1N1 Flu: background on the Situation

H1N1 Flu: What to do If you Get Flu-Like Symptoms

5. Simulation Elisa lab to detect the influenza virus

6. Divide students into groups for research activities: Student groups will rotate through both of these activities.

-Students log on to the Google Earth website and look up flu trends- They make a graph of the data as it changes each month.

-Log onto the CDC website and collect data for H1N1 Hospital cases as well as deaths

7. Field Trip Activities activities:

-Anatomy Honors classes: Trip to Progress Research Center in Alachua
Lab – Elisa testing

- A.P. Biology Trip to University of Florida Lab to perform DNA gel- electrophoresis

8. Culminating Activity: Class presentations use the following format:

- Photo story presentation
- PowerPoint

The presentations should include:

1. Information Pamphlet- this could be given to the public with pertinent information and statistic on H1N1 virus- including origin, spread, and treatment
2. The Photo story or PowerPoint should be an informational presentation that could be presented to other classes as well as the morning news- including origin, spread, and treatment of H1N1. The winning projects will be presented on the school news broadcast.

Data will continue to be collected through the flu season.

* Ideas for tracking flu were obtained from Maps in Medicine