SUNDAY Nature Academy 2018/2019: Influenza Outbreak

Description:
- Outbreaks (epidemics) have had devastating outcomes on the human population.
- Public health and other health care providers are essential in both preventing and managing outbreaks.
- This project will incorporate background information in addition to activities and simulations that help students to understand viruses and model the spread of infectious disease throughout a population.
- After the simulations, students will work in groups to evaluate data and answer questions

Learning Objectives:
After this lesson, students should be able to:
- Describe viruses and the field of public health and possible career paths
- Define commonly used public health terms related to outbreaks
- Apply principles related to the spread of disease and disease prevention

Standards:
- 1.12.1 Predict how health behaviors can affect health status. HS-PS3-2 Develop and use models to illustrate that energy is associated with motion and relative position of particles (objects).
- 1.12.2 Describe the interrelationships of mental-emotional, physical, and social health. HS-PS3-2 Develop and use models to illustrate that energy is associated with motion and relative position of particles (objects).
- 1.12.3 Analyze how environment and personal health are interrelated.
- 1.12.5 Formulate strategies to reduce or prevent injuries and health problems.
- 1.12.6 Analyze the relationship between access to health care and health status.
- 3.12.3 Evaluate the accessibility of products and services that enhance health.
Session Organization:
11:00 – 11:30 Cultural Connection
11:30 – 11:50 Background: viruses and vaccines
11:50 – 12:20 Activity 1
12:20 – 12:50 lunch
12:50 – 01:20 Presentations activity 1
01:20 – 01:35 Background outbreaks
01:45 – 02:20 Activity 2
02:20 – 02:30 Background public health
02:30 – 03:15 Activity 3
03:15 – 03:30 Wrap up

Activity 1
Create a Virus

Materials needed:
- Viral diseases list (included in activity – one per group)
- Computer (one per group)
- Drawing paper
- Pencils
- Colored pencils

Procedure:

1. Students get in groups of 3.
2. Each group select one of the following viruses:
   - Smallpox, Influenza, Herpes Simplex, Shingles, Epstein-Barr Virus,
   - Hantavirus, Yellow Fever, Severe Acute Respiratory Syndrome (SARS),
   - Bronchiolitis,
   - Chickenpox, Measles, Mumps, Polio, Rabies, Rotavirus, Warts
3. Groups look up their virus on computers and answer the following questions:
<table>
<thead>
<tr>
<th>Common name / scientific name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Structure / image</td>
<td>Reproduce in a drawing to present to class</td>
</tr>
<tr>
<td>How does it affect the human immune system</td>
<td></td>
</tr>
<tr>
<td>Geography; where in the world is it most common, most lethal, including the statistics</td>
<td></td>
</tr>
<tr>
<td>How it spreads; how fast it spreads</td>
<td></td>
</tr>
<tr>
<td>Symptoms in infected person</td>
<td></td>
</tr>
<tr>
<td>Organs it attacks in the human body</td>
<td></td>
</tr>
<tr>
<td>Danger factor: permanent damage / death</td>
<td></td>
</tr>
<tr>
<td>People most susceptible to the disease (e.g. old, young). Why some people get it and others stay healthy</td>
<td></td>
</tr>
<tr>
<td>Preventative methods of avoiding this infection</td>
<td></td>
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<tr>
<td>Treatment or cure</td>
<td></td>
</tr>
</tbody>
</table>
5. Present virus to class in 3-5 minutes.

**Activity 2**

**Influenza Outbreak**

Materials needed:
- White/Chalk board with writing utensil
- Timer
- Post it notes/stickers
- Pencils
- Worksheet with questions

Students will predict results ahead of time

1. Round 1: A previously identified “virus carrier” will circulate through the room and apply stickers to arm/hand on some but not all students.
   a. Number of “infected” students will be tallied and added to bar graph

2. Round 2: The “virus carrier” will again circulate with stickers, but this time will give its first 2 “victims” sheets of stickers in order to “vaccinate” more people with the disease.
   a. Numbers will be tallied at the end of the time period and added to bar graph

3. The next rounds cover preventive measures
   a. 20% of the class gets stickers representing “I’m vaccinated” label.
   b. More rounds continue with different percentages of participants receiving their “vaccination” stickers.
      i. (40%, 60%, 80%).
   c. Numbers are tallied at the end of each round and added to bar graph

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4. Answer questions:

a. What were some of the differences between Rounds 1 and 2?

<table>
<thead>
<tr>
<th>Round</th>
<th>Percent inoculated</th>
<th>Number inoculated</th>
<th>Number Infected</th>
<th>Total Infected – Total inoculated = total cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>20%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>40%</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>60%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>80%</td>
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</tbody>
</table>

b. Ask which round more closely represents a real-life epidemic and why.

c. How do different levels of vaccination affect how a virus spreads through a population?

d. How could you change the game to make it more realistic?

e. List any methods that might help prevent an epidemic from spreading.

f. How do vaccinations compare to other preventive measures, such as wearing a mask or washing hands, when it comes to reducing infections?

g. This activity represents one kind of model used in science teaching—a simulation of how a virus spreads. List some other examples of models used in science. Why do people use models?
Activity 3
Public Health

Materials needed:
- Computer (one per group)
- Writing paper
- Pencils

2. a. Pick health profession from list previously discussed
   b. Break into groups, each group selects a profession, go into computer lab to research 2 scenarios: then each group presents their scenarios
      i. There is a potential for an outbreak what is your career going to do about it?
      ii. There is an outbreak what is your career going to do about it?