Pandemics: How are Viruses Spread? Activity 2, 6-8

Right now students across the United States are being asked to stay home from school in order to self-isolate because of the COVID-19 virus. This means that people are supposed to stay inside of their home with their family and avoid physical contact with other people using a rule of staying 6 feet apart. If you were in school then the virus would spread more easily because students would be touching many of the same things. Think and respond to the following questions:

(1) If a school of 400 people remained open, predict how many days it would take for half of the people to become infected. Justify your reasoning.

Use the interactive and set the population size to 400 people to represent the number of students in a school and keep all other parameters the same.

(2) If the simulation starts with one infected person and all of the other parameters remain as is, determine how many school days it would take for approximately half of the people to become infected. Justify your reasoning.

(3) Were the results the same or different from your prediction? How come?

Infected individuals can spread the virus 14 days before they begin to feel ill. Change the parameters to represent this information as the number of days contagious.

(4) Given the new parameters, determine how many school days it would take for half of the people to become infected?

(5) Given the current parameters, use mathematical reasoning to explain how someone can predict the number of people that will become infected based on the number of days in school.

(6) Explain what other parameters might slow or speed up the spread of the virus in any school.

Pandemics: How are Viruses Spread? Activity 1, 6-8

Solution Guide

(1) If a school of 400 people remained open, predict how many days it would take for half of the people to become infected. Justify your reasoning.

Student might think about how the virus will exponentially grow to determine an estimation but they should draw on some mathematical reasoning to justify their responses.

(2) If the simulation starts with one infected person and all of the other parameters remain as is, determine how many school days it would take for approximately half of the people to become infected. Justify your reasoning.

At Day 27, approximately 50.2% of the population is uninfected and that means that approximately half of the population has been infected.

(3) Were the results the same or different from your prediction? How come?

Responses will vary but students should make connections between their original mathematical reasoning to how the results change over time. They will build on this response in the following questions.

(4) Given the new parameters, determine how many school days it would take for half of the people to become infected?

At Day 18, 50% of the population has become infected.

(5) Given the current parameters, use mathematical reasoning to explain how someone can predict the number of people that will become infected based on the number of days in school. Then, explain what other parameters might slow or speed up the spread of the virus in the school.

Students might use a table to compare the number of infected people per day but they should use evidence from the graph and results.

(6) Are there any other parameters that could influence the spread of the virus in any school?

Students might consider parameters like no school on the weekend decreasing the chance of contracting the virus or the number of contacts per day increasing based on what class they are in.