

Virus Travel Simulation II*

Teacher Prep

Pathogens are spread from person to person mainly through air, water, and physical contact. Most pathogens are difficult to avoid as they cannot be seen. This activity simulates the transmission of a virus through bodily fluid exchange. Viruses such as HIV and hepatitis are transmitted in this manner.

Objective: Students will understand how viruses can infect a large population by simulating viral transmission through the exchange of bodily fluids. The identity of the originally infected person will be found by analyzing data collected during the simulation.

Materials: phenolphthalein 1 test tube with rack per student
.01 M NaOH safety goggles
1 plastic transfer pipette virus travel student worksheet

Phenolphthalein is an organic compound (C₂₀H₁₄O₄) used as an acid-base indicator. (Interestingly, it is also the active ingredient in ExLax!) The compound is colorless in acidic solution and pinkish in basic solution (with the transition occurring around pH 9)

Teacher Prep:

1. Set up 30 test tubes numbered 1-30.
2. Place 5 ml of water in each test tube except for #10.
3. Place 5 ml of .01 M NaOH in test tube #10.

Safety Notes: NaOH can discolor fabrics and burn the eyes. Be sure safety goggles are worn at all times. If contact with skin or eyes occurs, flush immediately with water.

Initial Discussion: Students are told to select one test tube. (Be sure that test tube #10 is taken.) They are told that one student has a virus but is unaware of his/her condition. All students are going to a party where they will share drinks with several other people, transmitting the virus.

Procedure: See student lab sheet. To determine the original carrier, students need to eliminate all infected students that exchanged with a student that is not infected since they cannot be the original carrier. Students should be able to narrow the possible numbers down to two

Discussion: Explain to students that the original liquids were water and sodium hydroxide. The original infected student was given sodium hydroxide while all others were given water. The pink color was created by the phenolphthalein which turns pink when it reacts with a base at or above pH 9. Using the data from the simulation, students should work in groups to determine who came to the party with the virus and infected the other students.

*Adapted from http://star.ucc.nau.edu/~lrm22/lessons/disease/disease_lab.html and <http://services.juniata.edu/ScienceInMotion/bio/labs/Epidem/epidemic%20spread.doc>

Virus Travel Simulation II

Objective: Students will understand how viruses can infect a large population by simulating viral transmission. The identity of the originally infected person will be found by analyzing data collected during the simulation.

Materials: phenolphthalein 1 test tube per student
.01 M NaOH safety goggles
1 test tube rack per group of 4 students
1 plastic transfer pipette
virus travel student worksheet

Procedure:

1. **Put on safety goggles.** Select a test tube and write down the number of your test tube on your data sheet.
2. Find another student in the class and write his/her test tube number on your worksheet under exchange partner #1.
3. Exchange fluids with this person by completing the following:
 - Each person should fill his/her pipette with fluid from his/her test tube.
 - Simultaneously release this fluid into your partner's test tube.
 - Write the test tube number of the person with whom you exchanged fluids on the overhead next to your number.
4. Once the entire class has completed the first exchange, repeat steps 2-3 for exchange #2.
5. Once the entire class has completed the first exchange, repeat steps 2-3 for exchange #3.
6. Once the entire class has completed the first exchange, repeat steps 2-3 for exchange #4.
7. Place 1 drop of phenolphthalein in your test tube.
8. Record your observations on your worksheet.
9. If you observed a pink color change, circle your number on the overhead data sheet representing an infected person.
10. On your Class Exchange Data Sheet, copy the numbers of the circled, infected students and their exchanges.
11. Using the class data, determine the original number of the person who came to the party carrying the virus and transmitted it to other students. (HINT: Eliminate all infected students that exchanged with a student that is not infected since they cannot be the original carrier.)

Virus Travel

Name: _____

Period: _____

Exchange #1: test tube # _____

Exchange #2: test tube # _____

Exchange #3: test tube # _____

Exchange #4: test tube # _____

Assessment

1. Test tube number of the person that infected all other students: # _____

2. Calculate the percent of students that were infected by the virus at the party.

_____ %

3. How would the results differ if you exchanged fluids with more/fewer people in class?

More: _____

Fewer: _____

4. How would the results differ if people were continuously entering and leaving class?

5. How would the results differ if the infected person died very quickly/very slowly after contracting the disease?

6. How would the results differ if the infectious person showed visible symptoms?

3. Write a brief summary of how viruses are transmitted from person to person.

Class Exchange Data

Student #	Exchange #1	Exchange #2	Exchange #3	Exchange #4
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
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