

Viral Transmission Simulation Lab* 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: Bromthymol blue 1 test tube with rack per student
0.1 M HCl safety goggles
1 plastic transfer pipette virus travel student worksheet
Bromthymol blue is blue/green when neutral and turns yellow when acidic (infected)

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 0.1 M HCl in test tube #10.

Safety Notes: HCl 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 HCl. The original infected student was given HCl while all others were given water. The yellow color was created by the Bromthymol blue which turns yellow when it is in an acidic solution. 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 Transmission Simulation Lab

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:

Bromthymol blue	1 test tube per student
0.1 M HCl	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. You are dealing with acid and you don't know who has it.** 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 # _____
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 each other's test tubes. (fluid swap)

Everyone starts with 5ml of liquid and everyone ends with 5mls of liquid!!!!!!You should not lose volume during the exchange.

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 2mls of Bromthymol blue solution in your test tube.
8. Record your observations on your worksheet. (If it turns yellow, you are infected ☺)
9. Go to the Class exchange Data Sheet and enter your data
10. 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 - Data and Calculations:**Your test tube #** _____**Exchange #1: test tube #** _____**You (+ or -)** _____**Exchange #2: test tube #** _____**Exchange #3: test tube #** _____**Exchange #4: test tube #** _____**Class Exchange Data**

Student # (+ or -)	Exchange #1 Test tube #	Exchange #2 Test tube #	Exchange #3 Test tube #	Exchange #4 Test tube #
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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26				
27				
28				
29				
30				

Calculations:

- Calculate the number and the percentage of students who were infected by the virus

Lab Questions:

1. What is the Test tube number of the person that infected all the other students?
2. How would the results differ if people were continuously entering and leaving the party?
3. How would the results differ if the infectious person showed visible symptoms?
4. How would the results differ if the infected person died very quickly after contracting the disease?
5. Describe 4 ways viruses are typically transmitted.

Conclusions – Write at least one paragraph summarizing the main concepts of this lab and any conclusions you’ve made. Do NOT repeat the procedure to me.