

Lab: Transmission of Disease  
Adapted from: Melissa Portella (Science Ed. 2005)

**Purpose / Rationale:**

In the lab activity, students will explore how science, technology, and society are integrated. Viruses have an enormous impact on human populations. Technology has allowed us to study, control, test for and/or treat these viruses. Students will first simulate the spread of disease within a population. Students will then explore the basic characteristics of viruses, including why they are not considered living organisms.

The *Elaborate* activity will provide students with an online simulation of disease spread in which they can manipulate certain factors (method of transmission, number of people in a room, etc) and see the corresponding effects on rate of transmission.

**VA SOLs:**

- BIO. 1.** The student will plan and conduct investigations which meet the following criteria:
- e. Conclusions are formed based on recorded quantitative and qualitative data.
  - h. Chemicals and equipment are used in a safe manner.
  - i. Appropriate technology (computers, graphing calculators, and probe ware) is used for gathering and analyzing data and communicating results.
- BIO. 5.** The student will investigate and understand life functions of archaebacteria, monerans (eubacteria), protists, fungi, plants, and animals (including humans). Key concepts include the following:
- e. Human health issues;
  - f. How viruses compare with organisms.

**Materials and Resources:**

25 50-mL beakers  
Distilled water  
Bottle of Phenolphthalein indicator  
Eye dropper  
.01 M solution Sodium Hydroxide  
1 50-mL beaker  
Transparency (empty data chart)  
Biohazard sign  
Doctor's office sign  
Lab coat  
Lab activity sheet  
PowerPoint slide with potential viruses listed  
Laptop computers  
Activity sheets  
Internet: [www.explorelearning.com](http://www.explorelearning.com)

## Class Management and Safety Issues:

All students will be required to wear safety goggles during this lab due to the use of chemicals and glassware. Additionally, students should follow all safety rules while in lab. This includes no horse-playing and running. This also includes following all directions explicitly and cleaning up at the end of lab (which includes proper disposal of chemicals).

Students should follow the Acceptable Use Policy for using school computers and Internet.

## Procedure:

*Engage* (less than 5 minutes)

1. Students will be asked to provide the names of viral diseases that they would possibly like to become infected with today! Some possibilities are displayed on the Smart Board. The class will then take a few minutes to come to a final consensus about what virus to use.

*Explore* (25 minutes)

2. Each student will be provided with a 25-mL beaker filled with distilled water which represents their body fluids. One student will randomly be assigned a 25-mL beaker that contains drops of Sodium Hydroxide. This student represents the person that has become infected with the virus.
3. Students will then exchange body fluids with **three** other students by pouring one student's contents into the other student's beaker and then evenly distributing the body fluids between the two beakers. Students will record on their activity sheet each person's name that they exchange body fluids with.
4. After fluid exchange, students are notified that a viral disease is spreading through the population and that they should be tested for infection at once. Students will then report, one at a time, to the doctor's office. The doctor's office will be recognizable by an entrance sign and the "doctor" will be wearing a white lab coat. The teacher will place a few drops of Phenolphthalein indicator into student beakers. A pink liquid coloration indicates a positive (+) result for the presence of the virus. If the liquid is clear, the student has tested negative (-).
5. Students who test negative must then place the sick notices around their necks (red x's).
6. All students will then place their names and results on the blank data sheet (transparency).
7. Students will then attempt to identify the person originally infected.

*Explain* (30 minutes)

8. Students will review the lab activity and answer follow-up questions on the handout. Students will then explore the characteristics of a virus. This includes comparing a non-living virus to a living organism, outlining the three steps of viral infection, and discussing how antibiotics work. A notes outline will be provided.

*Elaborate* (30 minutes)

9. Students will further examine the transmission of viruses using the “Disease Spread Gizmo” found on [www.explorellearning.com](http://www.explorellearning.com). A handout will guide students through the process and will include additional assessment questions.

*Evaluate*

10. Notes will be checked for completion (5 points). Students will complete the “Transmission of Disease” and “Disease Spread Gizmo” activity sheets. The following rubrics will be used in grading:

Transmission of Disease Lab

<b>Section</b>	<b># Questions</b>	<b>Points Each</b>	<b>Points Total</b>
Scenario	1	2	2
Before Testing	3*	4	12
Make a Guess!	1	2	2
Time to Get Tested!	1	5	5
Let’s Track the Virus!	1	4	4
Summary	5	3	15
<b>TOTAL</b>			<b>40</b>

\*3 points given for completing each round, 1 point for recording name

Disease Spread Gizmo

<b># Questions</b>	<b>Points Each</b>	<b>Points Total</b>
8	2	16
1*	4	4
<b>TOTAL</b>		<b>20</b>

\*Final question