Disease Transmission Lab by C Kohn, Agricultural Sciences, WUHS

Group Names: Hour Date:

Date Assignment is due:  Why late? Score: + ✓ -
 Day of Week Date If your project was late, describe why

# Instructions:

1. **Complete the introductory questions on this worksheet on Page 2 before starting the activity**.
2. Obtain the following – 1 Plastic vial w/ fluid, gloves, eye-protection (aprons or lab coats are also recommended if available).
3. Randomly choose one classmate in your group as your first partner with whom you will “exchange fluids”. Transfer 10 ml of fluid into their tube. Then transfer 10 ml from their tube back into yours. This completes the “fluid exchange process”. Each person should exchange once within their group.
4. Record your first exchanges in the table below.
5. Wait for the ok from the instructor and then repeat steps 2 and 3 with different partners.
	1. Be sure to record all exchanges in the table below.
6. Wait for the ok from the instructor and repeat steps 2 and 3 with new partners (someone you have not yet exchanged fluids with).
	1. Be sure to record your third partner on this worksheet.
7. Test for the presence of your disease by obtaining 1 drop of the Disease Indicator Solution from the instructor.
	1. Record the color change on this worksheet. Pink indicates that your sample if positive for the disease (you have the disease). Clear indicates you are negative for the disease, or that you do NOT have the disease.
8. Record all of the names of your contacts on this worksheet.
9. Complete the remaining questions.

# Table 1: Fluid Exchange Contact

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   | Name (write below) | Name (write below) | Name (write below) | Name (write below) |
|   |   |   |   |   |
| *Exchanged with:* |   |   |   |   |
| Round 1 |   |   |   |   |
|   |   |   |   |   |
| Round 2 |   |   |   |   |
|   |   |   |   |   |
| Round 3 |   |   |   |   |
|   |   |   |   |   |
| Pos or Neg? |   |   |   |   |

# Questions – Complete #’s 1 and 2 before beginning the lab protocol.

1. In this lab, you will be simulating the acquisition and transmission of disease. In the space below, describe all of the conditions necessary for a disease to occur and be spread.
2. This exercise will begin with only one infected individual. By the end of three rounds of fluid exchange, how many students do you think will be “infected” by this disease? Explain.

**\*\*\*Complete the lab protocol and tables on the previous page before continuing on to the next question\*\*\***
3. Health is the absence of abnormal bodily symptoms or conditions. In this case, what would constitute as a “healthy” student?
4. Disease is the presence of an abnormal symptom or bodily condition. In this case, what would constitute as a “diseased” student?
5. What is the “symptom” of disease in this case?
*Note: can a disease be symptomless?*
6. Is this an infectious or non-infectious disease? Explain:

*Note: is the cause of an infectious disease internal or external?*
7. Is this a contagious or non-contagious disease? Explain:

*Note: can a disease be contagious and not be infectious?*
8. What is the “host” in this exercise?
9. What are the “antibody” and the “antigen” in this exercise?

*Note: it is possible that we could not have one or the other or both! Be sure to defend your answer!*
10. How did the environment of the classroom in this exercise promote or inhibit the spread of this disease?
11. How did the hosts promote or inhibit the spread of this disease?
12. ow What What role did the presence of the pathogen play in the likelihood of a student catching this “disease”?
13. If IWas this disease endemic, epidemic, or pandemic?

Explain:
14. If instead of students and fluid, this was actually a herd of pigs and a real disease, what changes could be made to ensure that as few pigs get sick as possible?
15. In what ways was this exercise an accurate reflection of how diseases are spread and transmitted?
16. In what ways was this exercise an inaccurate reflection of how diseases are spread and transmitted?

Instructor Instructions:
To prepare for this lab, you will need the following:

* 20-50 ml tap water per student
* 1 water-tight vial or test tube per student. (Tubes/vial must be able to be inverted w/o leaking; tubes should be at least 30 ml or more and cleaned prior to the lab.)
* Sodium Hydroxide (NaOH) – pellet form works best
* Phenolphthalein
* Protective gloves and eye-gear (NaOH is very corrosive! While it is very diluted in this lab and risks are minimal, protective gear is still recommended)

Prepare enough vials/tubes of tap water for everyone in the class. Make sure each tube or vial has at least 20 ml of tap water. Label each tube using any system you deem appropriate.

Add one pellet of NaOH to one tube. Record which tube has the NaOH. Check to make sure the tube/vial is sealed and shake or swirl until all of the NaOH is dissolved. This is your “diseased” tube and will serve as the source of disease for the rest of the class.

Randomly assigned tubes/vials to each student. Allow them to conduct the lab as described. When they have each exchanged 3 times apiece, use phenolphthalein as your “Indicator Solution”. One drop of phenolphthalein per 20-50 ml of water should be adequate. Be sure to use an eyedropper or pipette to add the drop to each vial of water. Any color change is symptomatic of contracting the “disease”.

Phenolphthalein is a common pH indicator and can be found in most high school chemistry supply closets. If you or your school does not have access to phenolphthalein, you can make it by crushing laxative containing phenolphthalein and dissolving the powder into 10 ml of rubbing alcohol. Be sure to let it soak for 15 minutes to completely dissolve.

Lab coats or aprons are recommended because phenolphthalein will cause a dramatic color change and can stain clothing.