

Microorganisms and Disease Lab
Pre-Lab Exercise

Name _____

1. Define epidemiology. Use your own words and base the definition on your understanding.
2. What is the difference between a virus and a bacterium?
3. What's the most common way to fight bacterial infections?
4. What's the most common way to fight viral infections?
5. Explain how bacteria can be grown in a lab.

Microorganisms and Disease Lab

Epidemiology is only one branch of the study of disease. Specifically, it is the study of the spread of disease. This lab is designed to demonstrate how an epidemiologist might track the spread of a communicable disease back to the original source.

Summary of Activities

1. Examine the previous week's petri dishes for microorganisms.
2. Spread a communicable "disease" by shaking hands.
3. Track the spread of disease and determine who was the first person to "get sick".
4. Watch the video: [The Plague Fighters](#)

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I. Microbiological Swabs

Microorganisms are everywhere. To give you an idea of how many microorganisms surround you, we will test our environment by swabbing various surfaces and smearing the samples onto nutrient agar dishes that allow certain types of microbial growth.

Materials:

- 1 nutrient agar petri plate per person
- sterile swabs
- sterile saline
- 37° C incubator

Procedure

1. Label your nutrient agar dish on the bottom (the side containing the agar). Include your name, the date, and your lab section. Lay your nutrient agar dish **UPSIDE-DOWN** on the bench top.
2. Open a sterile swab without touching the cotton tip. Dip the cotton tip into sterile saline, rotating the swab against the side of the tube to remove excess liquid.
3. Rub the cotton tip on any **ONE** surface of your choice. This may include door knobs, notebook surfaces, personal water bottles, desk tops, etc. Do not touch the tip of the swab to any other surfaces before you transfer your sample to your nutrient agar plate.
4. With one hand, pick up only the bottom of the dish, leaving the lid on the table.

With the other hand, carefully rub the swab across the surface of the petri dish. Return the

dish to its lid. Place your dish **UPSIDE-DOWN** in the wire cage labeled with your lab's section. These plates will be incubated at 25°C for several days, then refrigerated for your observation next week.

II. Epidemiology

1. Each person will receive a dish that is identified with a number and filled with a clear liquid. This clear liquid will represent your bodily fluids! All but one of the dishes will contain plain water. The exception will be one containing a solution of starch. This solution represents the "disease" we will be tracking. Write down your I.D. number on your data sheet.
2. You will exchange fluids with another student in the room. Pour the liquid back and forth between your dishes to thoroughly mix the liquids. This will simulate sexual contact and will represent the pathway of infection for this disease. Write the ID number and name of the person with whom you exchanged fluids.
3. Wait until everybody in the room has "done it" once before going on the next round. Repeat your exchange of fluid with a new student. Keep track of your contacts' I.D. numbers and the order in which you came in contact with them.
4. Once everyone has finished (please, no smoking) bring your dish to the front of the room for "diagnosis." We will use iodine to test for the presence of the "disease" (starch) by placing a few drops in your dish. Contact with the "disease" will be indicated by a bluish-black precipitate formed in the presence of the iodine (remember our biochemical tests lab?).
5. If you were diagnosed with the disease, report the I.D. numbers of those you shook hands with. We will use this information to determine the initial carrier of the disease.
6. Identify the initial carrier by a process of elimination. Any "sick" individual who came in contact with someone who was not infected will not be the initial carrier. Continue to eliminate individuals based on the order of their contacts.

Microorganisms and Disease Lab Report

Part I questions:

1. What was the treatment on your Petri plate?
2. How many colonies did you find on your group's Petri plate? How many different kinds of colonies did you find?
3. What can you say about the number of microbes that were in the area you tested?

Part II questions:

4. What is the pathway of infection for the epidemiology portion of this lab?
5. How did you determine who was the initial carrier of the "disease"?
6. Was it possible to know precisely who the initial carrier was? Why or why not?
7. Who were the possible initial carriers? (Hand in your data)
8. Describe two reasons why this lab is limited as a model for the spread of disease.

Movie questions:

9. How does the spread of Ebola virus differ from the spread of HIV?
10. What are some of the cultural factors that made it difficult for the Western medical team in their fight against the spread of Ebola?