Name:_____ **Date:**_____ **Sec:**_____

Worksheet - Lesson 2.3

Learning objectives. At the end of today's lesson you will be able to:

- explain the process by which a disease spreads.
- explain the effects of vaccination on the spread of a disease.

Do now:
What would you expect to observe if a disease is contagious?

Spread Simulation Activity:

Introduction:
An infectious disease is any disease caused by microbes that can be spread from one person to another. Microbes include bacteria viruses, and other agents, such as parasites.

This activity will simulate the spread of an infectious disease. A simulation is a simplified demonstration of a real biological process. Our simulation will show how an infectious disease can spread from one infected person to other people, who in turn infect others.

Procedure:

1. Your teacher will give everyone a container filled with a clear solution. This solution represents your bodily fluids. Only one person in the class will have a cup that has been "infected".

2. Each container has a number. Record down the number of your container.

3. In this part of the activity, you will interact with THREE other students. Watch your teacher for instructions.

   List in order the container numbers of the three people you interacted with:

   1st:_____ 2nd:_____ 3rd:_____

4. Estimate how many people you think will be infected in the class. _____
5. Your teacher will come around and put an "infection indicator" in your container. If you have exchanged solutions with the original infected person or someone else after they became infected, you are now infected and your solution will turn blue. If you have not exchanged solutions with anyone who was infected, your solution will turn slightly yellow (see the images below).

Infected (blue) **Not infected (yellow)**

6. Next, your teacher will ask everyone who is infected to raise their hands. How many people were infected? _____

Analysis:

7. In the space provided below complete a patient zero tree. All infected individuals should write down the numbers of the three people that they interacted with and write them on the board in order to determine whom they contracted the infection from. As a class decide if you can tell who started this epidemic.

Your cup number	Cup #, 1st interaction	Cup #, 2nd interaction	Cup #, 3rd interaction

8. The spread of the disease in our simulation was very rapid. Multiple people were infected within a few minutes. In real life, infections do not spread as rapidly as in this simulation. Why is the spread of infections slower in real life?

9. In addition to exposure to microbes, what other factors might influence your risk of getting an infectious disease; for example, what defensive barriers might your body use to prevent infection?

Discussion:
If we vaccinated half the class and ran the simulation again how many people would get infected?

Let's look at some data:

The spread of an infectious disease when **no one** is vaccinated:

DAY	1	2	3	4	5	6
Total cases	**100**	**200**	**400**	**800**	**1,600**	**3,200**
New cases	**0**	**100**	**200**	**400**	**800**	**1600**

How will the numbers look if **50% of the people** are vaccinated?

DAY	1	2	3	4	5	6
Total cases	**100**					
New cases	**0**					

Wrap up:
To help identify whether a disease is infectious we can use Koch's postulates.

1. Association:

2. Isolation:

3. Causation:

4. Re-isolation: