Name_____

Who was Infected First? – Sample Activity

Purpose

A contagious disease spreads from a diseased animal to a healthy animal through direct or indirect contact. Contagious diseases spread quickly through a population. Depending upon the transmission of a disease, the number of infected animals can grow exponentially. There are two main ways diseases are transmitted, direct and indirect contact. Direct contact is animal-to-animal contact. Indirect contact occurs in two ways, vectors and fomites. A vector is an agent, such as a mosquito, which spreads disease from one plant or animal to another. A fomite is an inanimate object that transmits a disease, such as a straw in a drink or a shared water trough.

To cure, treat, or prevent a disease, the carrier or initial person infected may need to be identified. Epidemiologists study the spread of diseases to determine the initial carrier and how the carrier introduced the disease to a population. How do you track the transmission of a disease from the population to the first carrier?

Materials

Per student:

- Cup of mystery liquid
- Disposable gloves
- Safety goggles
- Lab apron
- Pencil
- *Agriscience Notebook*

Procedure

Your teacher will provide a cup of mystery liquid to each student. One person's liquid will be infected and will spread the disease to other cups. Follow the spread of the disease.

Part One – Infection Transmission

1. Put on your personal protective equipment.
2. Obtain a cup of liquid from your teacher.
3. Your teacher will announce each exchange. Do not exchange solutions with the same person more than once.

Exchange One

4. Find one class member and exchange solutions according to the instructions below. Take care to avoid contact with your classmate other than the solutions in your cups.
    - Pour the contents of one cup into the other.
    - Swirl gently.
    - Pour one-half of the solution into the empty cup.
    - Use caution to avoid spilling any of the solution.

5. Record the name of your contact in *Exchange One* in Table 1.

Table 1. *Contacts*

Exchange	Exchange One	Exchange Two	Exchange Three
Contact			

6. Repeat Steps 4–5 for the second and third exchanges.
7. Answer the prediction questions.

Prediction Questions

Q1 What is the maximum number of infected individuals possible after three rounds?

Q2 If one of your classmates had a highly contagious disease, how likely is it that you have contracted the disease?

Part Two – Epidemiology

1. Your teacher will test all solutions for "infection." Infected solutions will turn pink in color. Uninfected solutions will remain colorless.
2. If your solution is infected, record your name and your contacts on the board.
3. Record the class results in Table 2.
4. Discuss with a partner who was possibly infected first.
5. Dispose of the cup and solution according to your teacher's instructions.
6. Your teacher will reveal the original infected solution carrier. Compare your diagram to the identified carrier.

Table 2. *Determining the Path of Transmission*

Student	Contact One	Contact Two	Contact Three

Sample Teacher Notes

Students simulate the transmission of a contagious disease in this activity.

Teacher Preparation
Before the beginning of class, prepare one small cup of distilled water for each student. Fill each cup approximately ⅓ full of distilled water. Discreetly designate one cup as the infected solution to prevent students from guessing which solution is infected. Add 40 drops of 0.5M NaOH to the distilled water in the infected cup.

Students will need to exercise the following precautions when exchanging liquid. Review the safety precautions and instruct students to put on their personal protective equipment, including safety goggles, gloves, and aprons, before passing out any liquids.

- Students must correctly wear all personal protective equipment provided.
- Students must not drink or sniff the solution.
- Students must not allow any solution to come into contact with skin or clothing.
- Students must notify the teacher immediately if a spill occurs.
- If a student splashes liquid on him or herself, immediately flood the affected area with water.

Student Performance
Part One
Distribute the cups to students after reviewing the safety precautions and lab procedures. Take note of the student who receives the infected sample without disclosing it to the students.

Instruct students when to begin each exchange and remind them to record their contact after each exchange. Students will exchange with a different classmate each time.

Part Two
After students have completed the exchanges, test each of their solutions with three to four drops of phenolphthalein. The solution in cups of infected students should turn pink, while uninfected individuals will remain clear. Students should attempt to diagram the spread of the infection and identify the original carrier. When all students have completed this, reveal the infected solution to all students. They compare the results, then answer the analysis questions while you dispose of the solutions.

Disposal
After testing all students' cups, collect the solution in a large container. Test the pH of the solution. If necessary, adjust the pH to neutral using small amounts of 1.0M acid before disposing of the solution.

Sample Activity

This sample is a modified version of *Activity 7.1.3 Who was Infected First?* from the CASE 4 Learning *Principles of Ag Science – Animal* (ASA) curriculum. For more information about the course visit **www.case4learning.org**. The sample has been modified for time and material simplification to fit a workshop format and is not for resale or profit. Teachers are permitted to use this sample in their classroom without certification.

Contact **CASE 4 Learning** to receive permission to use this sample at a teacher professional development.

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>
> **- Alicia Flowers, Missouri**

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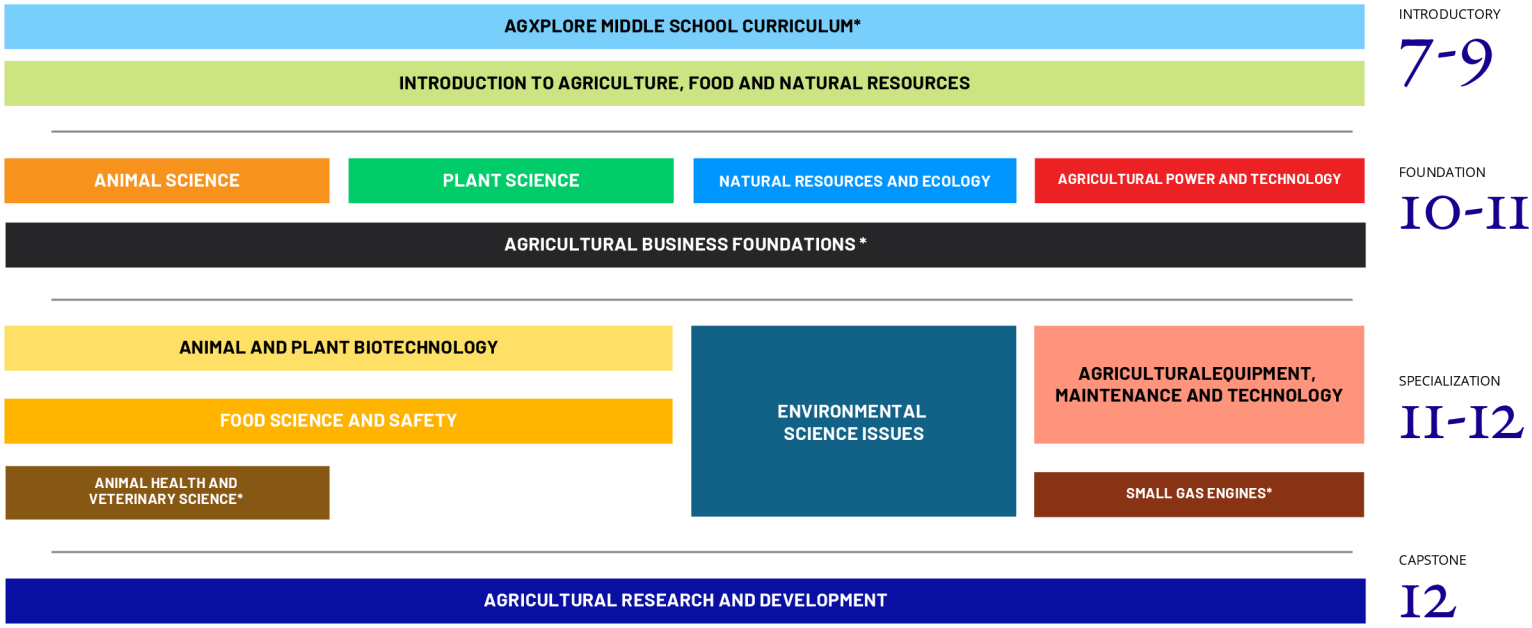

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