

**TIME**

Set Up: 10 Min
Activity: 10-15 Min

SKILL LEVEL

Beginner

OBJECTIVE

Participants will be able to:
Explore and understand how disease can be spread through bodily fluids, like mucus, between animals and humans.

SUPPLIES

1/8 cup (1oz.) distilled water per participant

5 oz. disposable cup for each participant

Dropper bottle of sodium carbonate standard solution 0.02N (Positive Solution)

Dropper bottle of phenolphthalein solution 0.1% (Testing Solution)

Disposal container large enough to accommodate liquid from all participant cups

ZOONOTIC DISEASES LESSON

Mucus Among Us

VOCABULARY

Mucus - a slippery substance produced by the body to help with lubrication and to aid in trapping germs. Humans have mucus membranes in several places, including the nose and lungs. Animals produce mucus in the same way as humans and for the same purposes.

Biosecurity - steps taken to prevent the spread of germs and keep humans and animals healthy.

Zoonotic Diseases -diseases that can be shared between animals and humans.

Influenza - a zoonotic disease that causes coughing and fever.

BACKGROUND

Just like humans, animals can also spread germs through mucus. Animals who share the same water or feed troughs share germs from their mouths and noses. When animals lick things germs can spread, or when they cough or sneeze, tiny mucus particles spread through the air, just like when you cough or sneeze. Animals not only share germs with each other, but with humans too! Germs that can be passed between animals and humans that cause illness are called zoonotic diseases. Influenza is a zoonotic disease that can change or mutate in the body. This means it can become easier to infect other animals or people and can make them sicker.

When many animals are together at an exhibition like a fair, those animals may bring germs from their farm, share their germs, and then bring new germs back home after the exhibition. Today we're going to do an experiment to see how quickly germs can spread between animals at an exhibition.

PRE-ACTIVITY QUESTIONS

1. What are some ways germs spread? Have you ever “shared” an illness with a family member?
2. What is mucus? How is mucus spread?
3. We’re going to do an experiment that demonstrates how germs that cause disease can spread through mucus. How many animals in our group do you predict will be infected?

ACTIVITY

PREPARATION

1. Add approximately 1/8 cup (1 oz.) of distilled water to a disposable cup for each participant; filling the cup about 1/3 full. This should be done just before the activity begins, to ensure pH changes do not occur. In addition, do not use tap water, as not all water sources are pH neutral.
2. To make “positive mucus” add ¼ teaspoon (~25 drops) of sodium carbonate standard solution to one cup. You should have 1 positive mucus cup for every 5 participants. Place a small, inconspicuous mark on each of the “infected cups,” to be identifiable later.

ACTIVITY

1. Pass out one cup to each participant, explaining that each represents an animal at an exhibition. Point out that each cup and the liquid inside looks the same and that you can’t necessarily tell if an animal is carrying a germ that causes disease by looking at them. Discuss animal contact within a show setting, and then instruct students to exchange water (swap mucus) with three other participants. To complete an exchange, the participant should pour all the liquid from their cup into another participant’s cup, and then half should be poured back in to the original cup. As students are exchanging mucus, announce that (n= #infected cups) animal(s) came to the show already infected with a respiratory disease.
2. As students finish swapping, ask if they can tell who is “infected,” and how many additional animals they think may now be “infected.”
3. To determine whether each individual’s animal is “infected,” add 2 drops (~100ul) of phenolphthalein solution to each cup. If the liquid turns pink, the animal is infected, if the liquid remains clear the animal is negative. Discuss how diseases spread within the animal population, and allow participants time to figure out who started as “infected” by tracking their swapping partners. Confirm using the inconspicuous marks on the infected cups.
4. Pour liquid from all cups in disposal container and thoroughly wash and rinse cups, if you plan to reuse.

PROCESS

1. Did your animal get infected? Why or why not?
2. Can you determine the source of your animal's infection? How?
3. How is this activity like an animal show environment?
4. Where does animal mucus end up that it could be shared between animals? Animals and humans?

EXPAND

1. What precautions can you take to prevent disease transmission between animals? Animals and humans?
2. What precautions do you already take? What are some precautions you don't take that you should?
3. What other ways do you think germs can spread? To animals? To people?
4. How will this change your biosecurity practices?

RESOURCES

[Visit the Upper Midwest Agricultural Safety and Health Center \(UMASH\) agritourism website:](http://umash.umn.edu/agritourism/)
<http://umash.umn.edu/agritourism/>

QUESTIONS OR COMMENTS

Send a message to joerand@umn.edu.

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