



# Science Experiment: Outbreak! Investigating Epidemics Project: Health

## **Supplies:**

- **Coffee Filters**
- **Scissors**
- **Paperclips or small envelopes**
- **Baking soda**
- **Water**
- **Measuring Cup**
- **Red Cabbage**
- **Pot**
- **Kitchen knife**
- **Jar or test tubes or paper cups**
- **Paper (1 per participant or pair)**
- **Pen or pencil (1 per participant or pair)**

**Time: Approx. 1 Hour (Prep); 1 Hour (Activity)**

## **Preparation:**

1. Make the baking soda solution for “infected” strips.
  - a. Add a couple of tablespoons of baking soda to one cup of water.
  - b. Stir the baking soda so that it dissolves.
  - c. Keep adding baking soda until it does not fully dissolve and collects at the bottom of the cup. At that point the solution is saturated. Now dip five strips into the solution for a few seconds.
2. Cut up enough filter paper (approx. 1” by 3”) so that each participant will have five strips of paper.
3. Group five strips together using a paper clip or envelope.
4. Randomly select one group of 5 strips and dip them in the saturated baking soda solution for a few seconds. For a large group you may want to select more than one group of strips to be “infected.” You can also have participants work in pairs if needed.
5. Allow the strips to dry on a clean surface. This will take about an hour.
6. Regroup the infected strips so they look like all of the other strips in our pile.
7. Prepare the red cabbage pH indicator.
  - a. Cut a head of red cabbage in half. Cut the cabbage halves into small pieces with a kitchen knife.
  - b. Place pieces of cabbage into a large pot and add enough water to cover the shredded cabbage.
  - c. Bring the water to a boil and boil for 30 minutes.
  - d. Drain of the cabbage pieces and allow the cabbage juice to cool. (You can store the solution in the refrigerator for a number of weeks.)
  - e. On the day of the simulation, place the cabbage juice in a jar in a central location to serve as the “microbe testing station.” Alternatively, you can pour small amounts of the cabbage juice into plastic test tubes or paper cups, so that student groups have their own testing station.

**What to Do:**

1. Discuss that epidemiology works to uncover and explain the factors that determine disease frequency and distribution. Epidemiologists identify infectious agents; determine how they are spread, who gets infected, and the results of infection.
2. Tell the participants that they will be receiving five strips of paper that represent an unknown pathogen (germ) that can be passed from person to person through methods such as touch or the exchange of bodily fluids. Distribute the strips of paper.
3. Instruct the students to write their initials or names on each of their five strips.
4. Begin the simulation by telling students to trade one strip with another student. On a sheet of paper, they should write down who they traded with (the name on the strip that they gave out and the name on the strip they received).
5. On the first trade they must give away one of their strips, on the following trades they may give away any strips that they have in their possession, but still only give away one strip per trade.
6. The leader of the activity should decide how many trades they should make. (8-12 trades is a good range to consider)
7. Once all the trading has stopped, ask them to use the indicator solution (red cabbage juice) to see who is holding the "infected" strips. They should dip each strip in the indicator solution one at a time to get an accurate reading. If the strip turns GREEN, it is one of the infected strips.

**Reflect:**

1. Can you determine who the original source of the epidemic was?
2. How many people in the group were exposed to the microbe?
3. Was it easy or difficult to trade?

**Apply:**

1. What factors might have increased the chance of exposure to the microbe?
2. It was possible to trade with an infected person but not get the disease. How do you think this relates to real life situations?
3. What factors affect the amount of exposure to a microbe in real life? (ex. Washing hands)
4. Can you think of any examples of epidemics that you know about?