

# Exploring Antibody Testing (Facilitator Guide)

When highly infectious pathogens emerge in a population, it is important to find ways to help people identify when they are infected without relying on clinics. This helps citizens to make decisions to stay home and avoid public spaces when they are infected. One test that became readily accessible during the COVID-19 pandemic was the Lateral Flow Assay, which detected the antigens found on the SARS-CoV-2 virus.

In this experiment, you explore the scientific principles that allow a Lateral Flow Assay to work.

## Materials:

- Filter Paper- Length 3 inches
- Cotton swabs-1 per pair
- Transfer pipette- 1 per pair
- Test tubes or microcentrifuge tubes for solutions. Aliquot 1mL of the following solutions into tubes:
  - Basic solution: Mix 15 g baking soda in 50mL of water. Stir until dissolved.
  - pH indicator: If you have access to Phenolphthalein that will work best but you can also make your own indicator.
    - Red cabbage indicator recipe:
      - Tear several leaves of red cabbage into small pieces and place into a blender.
      - Add about a cup of hot water into the blender.
      - Blend until color is leached out of the leaves.
      - Strain out the solids, leaving blue liquid. This is your indicator.

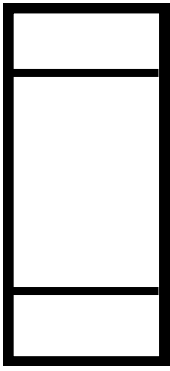
## Set up

Each pair of students will need:

- 1mL of basic solution
- 1 mL of pH indicator
- 1 cotton swab
- 1 transfer pipette

## Procedure

1. Dip a cotton swab in the pH indicator. Draw a line across the filter paper 1 inch from the end using the cotton swab. Press gently.
2. Allow the paper to dry for 2 minutes. (Lying flat on a table)
3. Use the transfer pipette to drop 3 drops of basic solution 1 inch from the other end.
4. Watch what happens to the paper and record your observations.



## Observations

Describe what happened to the filter paper.

## Analysis

1. What process allows the liquid to be pulled through the filter paper? *A: The liquid is pulled through the filter paper through capillary action.*
2. If the basic solution were a patient sample, what do you think should be on the paper to help diagnose the presence of an antigen? *A: If the patient were checking for a viral infection there should be something on the test strip that could identify the presence of a virus.*
3. All commercially available antigen tests have a test line and a control line. What is the purpose of the control line?  
*A: The control line is meant to assure the user that there were antigens present and the test strip is working properly.*
4. Antigen tests can produce false negatives, which means an antibody is not detected even though the person is infected. What are the consequences of a false negative? *A: A false negative can give a person a false sense of security, which may cause them to spread their viral infection to other people.*



**PROMISE**