

CHAPTER 6	Investigation 6.A: An Empirical Definition for Acids and Bases	BLM 6.1.5
HANDOUT		

Many useful household substances are acids or bases. In this investigation, you will use known acidic and basic substances to determine the properties of acids and bases and to develop an empirical definition for each.

Question

What are the properties of acids and bases?

Safety Precautions



- Household solutions containing acids and bases are often toxic or corrosive. Wash any spills on skin or clothing with plenty of cool water. Inform your teacher immediately.
- If you are using a conductivity tester with two separate electrodes, keep the electrodes well separated while you perform your tests.
- Do not taste any of the substances you are working with.
- When you have completed the investigation, wash your hands.

Materials

- Solutions of:
 - hand soap
 - laundry detergent
 - glass cleaner
 - antacid
 - milk
 - sour milk
 - carbonated water
 - soda pop (carbonated)
- soda pop (flat)
- apple juice
- vinegar
- baking soda
- water and table salt solution
- red and blue litmus paper
- pH paper and/or pH meter
- short strips of magnesium ribbon
- spot plate
- dropper
- conductivity tester
- beakers

Procedure

1. Read the procedure steps on the following page and construct an appropriate table to record your results.

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2. Perform a litmus test on the solutions by placing a small amount on red and blue litmus paper. Record your observations.
3. Determine the pH of the solutions using either pH paper or a pH meter. Record your observations.
4. Determine whether each solution conducts electric current by placing 25 mL of a solution into a 50 mL beaker and using the conductivity tester. Record your observations.
5. Determine the reactivity of each solution with Mg(s) metal by placing 5 mL of the solution into a test tube and adding a small piece of the Mg(s). Record your observations.
6. Dispose of all materials as directed by your teacher.

Analysis

1. Use your observations to design a chart or concept map to compare the properties of acids and bases.
2. Categorize your solutions by their use. What is one common use for bases? What is one common use for acids?

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3. What happens to the pH of milk as it sours?

Conclusion

4. As a class, write an empirical definition for acids and an empirical definition for bases.

Extension

5. (a) How did the pH of the carbonated soda pop compare with the pH of the flat soda pop?

(b) (Perform this activity at home.) How does carbonated water taste compared with regular water? How does carbonated soda pop taste compared with flat soda pop? What might account for the difference in taste?

6. What are the names of the acids and bases in each of the products you tested? You will find some of the answers in Table 6.1 in the text. For other answers, examine the labels of the products, and use the Internet to conduct research. 