

CHAPTER 6

REAL-WORLD LAB

You, the Consumer

The Antacid Test

Consumers see or hear ads for antacids on television, radio, and in magazines. Each product claims to “neutralize excess stomach acid” best. You can experiment to see whether some antacids really do work better than others.

◆ Problem

Which antacid neutralizes more stomach acid?

◆ Skills Focus

designing experiments, measuring, interpreting data

◆ Materials

3 plastic droppers
small plastic cups
dilute HCl, 50 mL
methyl orange solution, 1 mL
liquid antacid, 30 mL of each brand tested

◆ Procedure



Review the safety guidelines in Appendix A

◆ Part 1

1. Using a plastic dropper, put 10 drops of hydrochloric acid, HCl, into one cup.
CAUTION: *Hydrochloric acid is corrosive. Rinse spills and splashes immediately with water.*
2. Use another plastic dropper to put 10 drops of liquid antacid into another cup.
3. Record the colors of the HCl and the antacid in the data table on the next page.
4. Add two drops of methyl orange solution to each cup. Record the colors you see.
5. Test each of the other antacids. Discard all the solutions and cups as directed by your teacher.

REAL-WORLD LAB *(continued)*

◆ Part 2

6. Methyl orange changes color at a pH of about 4. Predict the color of the solution you expect to see when an antacid is added to a mixture of methyl orange and HCl.
7. Design a procedure for testing the reactions of each antacid with HCl. Decide how many drops of acid and methyl orange you need to use each time.
8. Devise a plan for adding the antacid so that you can detect when a change occurs. Decide how much antacid to add each time and how to mix the solutions in order to be sure the indicator is giving accurate results.
9. Make a second data table to record the observations you will need to make.
10. Carry out your procedure and record your results.
11. Discard the solutions and cups as directed by your teacher. Rinse the plastic droppers thoroughly.
12. Wash your hands thoroughly when done.

◆ Data Table

Substance	Original Color	Color With Indicator
HCl		
Antacid Brand A		
Antacid Brand B		

REAL-WORLD LAB *(continued)*

◆ Analyze and Conclude

Write your answers on the back of this sheet or on a separate sheet of paper.

1. What is the function of the methyl orange solution?
2. Do your observations support your predictions from Step 6? Explain why or why not.
3. Why do you think antacids reduce stomach acid? Explain your answer, using the observations you made.
4. Why is it important to use the same number of drops of HCl in each trial?
5. Which antacid neutralized the HCl with the smallest number of drops? Give a possible explanation for the difference.
6. If you have the same volume (number of drops) of each antacid, which one can neutralize more acid?
7. Did your procedure give results from which you could draw conclusions? Explain why or why not. What would you do differently if you were to do the tests again?
8. **Apply** If you want to buy an antacid, what information do you need in order to decide which brand is the best buy?

◆ Getting Involved

Look for antacids in a local grocery store or drug store. Check the ingredient lists of several brands. What are some of the different bases used in commercial antacids? (*Hint*: Look for compounds containing “hydroxide.” Check out any compound identified as the “active ingredient.”) Compare the advertised strength of several brands.