



# How Much Calcium Carbonate Is in an Eggshell?

## OBJECTIVES

- *Determine* the amount of calcium carbonate present in an eggshell.
- *Relate* experimental titration measurements to a balanced chemical equation.
- *Infer* a conclusion from experimental data.
- *Apply* reaction stoichiometry concepts.

## MATERIALS

- |   |   |
|---|---|
| • 1.00 M HCl  | • drying oven                                 |
| • 1.00 M NaOH   | • eggshell                                    |
| • 10 mL graduated cylinder                              | • forceps                                     |
| • 50 mL micro solution bottle or small Erlenmeyer flask | • mortar and pestle                           |
| • 100 mL beaker   | • phenolphthalein solution                    |
| • balance   | • thin-stemmed pipets or medicine droppers, 3 |
| • desiccator (optional)                                 | • weighing paper                              |
| • distilled water                                       |   |



## BACKGROUND

The calcium carbonate content of eggshells can be easily determined by means of an acid/base back-titration. In this experiment, a strong acid will react with calcium carbonate in eggshells. Then, the amount of unreacted acid will be determined by titration with a strong base.

## SAFETY



For review of safety, please see **Safety in the Chemistry Laboratory** in the front of your book.

## PREPARATION

1. Wash an empty eggshell with distilled water and carefully peel all the membranes from its inside. Place *all* of the shell in a premassed beaker and dry the shell in the drying oven at 110°C for about 15 min.
2. Copy data and calculations tables from your teacher.
3. Put exactly 5.0 mL of water in the 10.0 mL graduated cylinder. Record this volume in your data table. Label the first pipet "Acid." To calibrate the pipet, fill it with water. **Do not use this pipet for the base solution.** Holding the pipet vertically, add 20 drops of water to the cylinder. Record the new volume of water in the graduated cylinder in the first data table under Trial 1.
4. Without emptying the graduated cylinder, add an additional 20 drops from the pipet. Record the new volume for Trial 2. Repeat this procedure once more for Trial 3.