

# The Scientific Method

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**Objective:** to become familiar with the scientific method

## Procedure:

1. Place four drops of universal indicator in each of three wells of a test tray.
2. Into the first well put three drops of water.
3. Into the second well put three drops of dilute hydrochloric acid.
4. Into the third well put three drops of dilute sodium hydroxide.
5. Into the fourth well put three drops of sodium chloride.
5. Record the color change and the pH of water, HCl, NaOH and NaCl in Table 1.
6. Into three more wells add three drops each of universal indicator.
7. Add unknown A to the first, B to the second, and C to the third.
8. Record color changes and the pH for each in Table 2.
9. Based on the pH chart provided (or in your text) determine which unknown substance is lemon juice, vinegar, and ammonia.

## Questions:

1. What substance in this exercise represents the control? Why is it necessary to have a control?
2. Why was it necessary to measure the pH of HCl, NaOH and water in spite of the fact that the pH chart gives you the pH of these substances?
3. What assumption can be made about the correlation between color and pH?
4. Explain how you were able to identify the unknowns with the available evidence.
5. How has written information supported your conclusion regarding the identities of the unknowns?

## Conclusion:

Explain how the scientific method is different from trial and error.