Investigating Mixtures Activity: Gannon Sugimura

Students' Guide

Goals

- To learn from liquid mixtures about what happens in a chemical reaction
- To investigate a phenomenon and suggest chemically based explanations for it

The Laboratory

In this laboratory, you will investigate the mixing of several pairs of different liquids. You will predict what will happen and then relate that to the results of mixing: what is the total volume after mixing and what additional phenomena you observe in the process.

Materials for Each Group

- 150 ml water in three 50 ml portions
- 50 ml ethanol
- 50 ml 1M HCl
- 50 ml 1M NaOH
- 4 50 ml volumetric flasks
- 2 100 ml volumetric flasks

It is advisable to have a little extra of the liquids, so an exact volume can be measured.

SAFETY

Wear goggles at all times in the laboratory.

HCl and NaOH are harmful. Do not spill them on your hands. Be careful when you mix them.

Instructions

A. Mixing water

1. Fill two with water up to the line.

2. If you mix these two liquids, what do you think will be the total volume? _____

_____

3. Pour the water from both flasks into a third. Where does the meniscus of the water-column rest, relative to the 100 ml line? _____

_____

4. Did you actually cause a chemical reaction in this case? Why? _____

_____

_____

B. Mixing water and alcohol

1. Now fill up one 50 ml volumetric flask with water and the other with ethanol.

2. What do you expect that the total volume will be? _____

3. Again fill the 100 ml volumetric flask with both liquids, and note where the meniscus is, relative to the 100 ml line. _____

_____

4. Pour the liquids into a 100 ml graduated cylinder, and write down the total volume of the mixture:

_____

5. Is this what you expected to happen? _____

6. Suggest a molecular explanation for this phenomenon: _____

_____

7. Has a chemical reaction occurred? _____

C. Mixing acid and base

1. Fill one 50 ml volumetric flask with 1M HCl and the other with 1M NaOH.

2. What do you expect will happen? _____

_____

3. Mix the liquids and record your observations: _____

_____

4. Do you think a chemical reaction has occurred? _____

5. How do you know? _____

6. Write down the reaction: _____

_____

7. Suggest an explanation for the water level that you have observed: _____

_____

Summary

Explain the difference between the chemistry of mixing water and ethanol vs. mixing acid with base. Which chemical principles are involved in each process? _____

_____