

Rainbow Tube

Concepts

Explanation:

This demonstration is based on the diffusion of liquids as well as the neutralization of acids and bases. When you add the acid or base into one end of the tube it will slowly diffuse to the other end (helped by the bubble) with the highest concentration located closer to the end of the tube that the liquid was added. This then plays into the neutralization effect as the concentration of the acid and base depends on the position in the tube you are looking at. If you consider the position in the center of the tube and you have perfect mixture and concentration (same amount added) you will have the same amount of acid and base and therefore a neutral solution. However this rarely happens just for the record. As you move away from the center of the tube the concentration of acid or base increases as you move closer to the end that it was added and the other decreases. This then creates a gradual change in the pH as you pass from one end of the tube to the other. Upon adding the indicator this is shown by the gradual color changes within the tube.

Sources:

If you have other explanations, concepts, or ideas for this demonstration please share them by contacting our Chem Demo team (bedell@nku.edu; sieveb1@nku.edu). We will pass them on to the community and credit you with the ideas.