

Practical activity that forms part of the Gr 10 Physical Sciences 3-in-1
Class text and Study Guide. See p. 141 MODULE 3 TOPIC 3 Unit 4 for the theory.



PRACTICAL INVESTIGATION

PART 3

Acid-base reactions in aqueous solutions

Materials

○ 2 test tubes with the following dilute solutions:

○ 1 – NaOH

○ 2 – HCl

○ indicator, e.g. bromothymol blue

○ 2 medicine droppers

Method

- 1 Use the medicine dropper to add a few drops of the indicator to test tube 1 (NaOH). Note the colour of the indicator in the dilute NaOH solution.
- 2 Use the clean medicine dropper to add dilute HCl to test tube 1 until a colour change is observed.

Observations and discussion

- Bromothymol blue indicator appears blue in a basic solution such as NaOH.
- A colour change from blue to yellow shows that an excess HCl has been added to the NaOH.
- An acid-base reaction has occurred.
- Acid-base reactions are also ion exchange reactions.

$$\text{reaction equation: } \text{NaOH(aq)} + \text{HCl(aq)} \rightarrow \text{NaCl(aq)} + \text{H}_2\text{O(l)}$$

$$\text{ionic equation: } \text{Na}^+(\text{aq}) + \text{OH}^-(\text{aq}) + \text{H}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{Na}^+(\text{aq}) + \text{Cl}^-(\text{aq}) + \text{H}_2\text{O(l)}$$

$$\text{net ionic equation: } \text{OH}^-(\text{aq}) + \text{H}^+(\text{aq}) \rightarrow \text{H}_2\text{O(l)}$$

Conclusion

- An ion exchange (**transfer of a proton, i.e. H^+**) occurs when the dilute acid and base are added together. This is called an acid-base reaction.