**Neutralisation Reactions: Reactions of acids and hydroxides**

**Background**

A neutralisation reaction is when an acid reacts with a base, in this case a hydroxide. This reaction produces water and a salt.

Neutralisation reactions are very common. Every time we brush our teeth, the toothpaste, which contains a base, neutralises the acids left on our teeth by bacteria. Indigestion, which is caused by too much acid in the stomach, can be relieved by taking an antacid, which are bases in liquid or tablet form.

The general reaction equation for an acid combining with a hydroxide is:

acid + hydroxide → water + salt

When hydrochloric acid reacts with sodium hydroxide, it produces water and sodium chloride.

HCl + NaOH → H2O + NaCl

**Aim**: To investigate the neutralisation of a hydroxide with an acid.

**Equipment**: Test tubes x2

Test tube rack

Measuring cylinder

Universal indicator

Sodium hydroxide (NaOH)

Potassium hydroxide (KOH)

Hydrochloric acid (HCl)

Sulphuric acid (H2SO4)

Safety glasses

**Method**:

1. Measure 5 mL of sodium hydroxide in the measuring cylinder, and then pour it into a test tube.
2. Add two drops of universal indicator. Record the colour in the results table.
3. One drop at a time, add hydrochloric acid until you notice a permanent colour change. Record the colour in the results table.
4. Record how many drops of acid you added in the results table.
5. Repeat steps 1-4 for sodium hydroxide and sulfuric acid.
6. Repeat the process for potassium hydroxide and both acids.

**Results**:

Results for **sodium hydroxide**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Initial colour of indicator | Final colour of indicator | No. of drops of acid added |
| Hydrochloric Acid (HCl) |  |  |  |
| Sulfuric Acid (H2SO4) |  |  |  |

Results for **potassium hydroxide**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Initial colour of indicator | Final colour of indicator | No. of drops of acid added |
| Hydrochloric Acid (HCl) |  |  |  |
| Sulfuric Acid (H2SO4) |  |  |  |

**Questions:**

1. What colour does universal indicator show when a substance or solution is neutral?
2. Using this method, were you able to neutralise each of the bases with acid? Why or why not?

1. Bees can give you a very nasty sting. The painful sting is caused by the formic acid they inject.
   1. What can be done to relieve the sting, and why would it work?
   2. Explain why vinegar would not relieve a bee sting.
2. Write a word equation for each of the reactions you conducted in your experiment.
3. Sodium hydroxide + Hydrochloric acid →