Making a pH Indicator Lab

In this lab, students will investigate how an extract from red cabbage can be used as a acid-base indicator

Science 10

Curriculum Connections:

BC Science 10 (2017)
Acid-Base chemistry

BC Science 10 (2008)
C2 - classify substances as acids, bases, or salts, based on their characteristics, name, and formula

Posted to TeachBC by
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Chemistry: Making a pH Indicator Lab

Introduction:

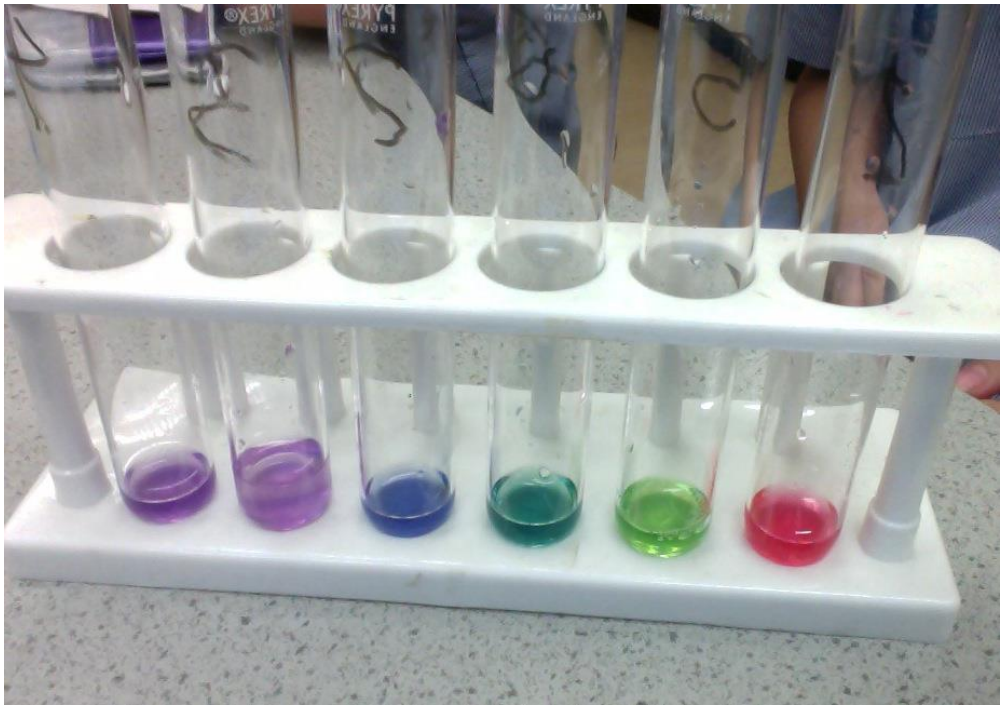
You are going to make your own pH indicator solution. Red cabbage juice contains a natural pH indicator that changes colours according to the acidity of the solution. Red cabbage juice indicator is easy to make, exhibits a wide range of colours, and can be used to make your own pH paper strips

The Science:

Red cabbage contains a pigment molecule called flavin (an anthocyanin). This water-soluble pigment is also found in apple skin, plums, poppies, cornflowers, and grapes.

Very acidic solutions will turn anthocyanin a red colour. Neutral solutions result in a purplish colour. Basic solutions appear in greenish-yellow. Therefore, it is possible to determine the pH of a solution based on the colour it turns the anthocyanin pigments in red cabbage juice.

The colour of the juice changes in response to changes in its hydrogen ion concentration. pH is the $-\log[H^+]$. Acids will donate hydrogen ions in an aqueous solution and have a low pH ($pH < 7$). Bases accept hydrogen ions and have a high pH ($pH > 7$).



Purpose:
To make a pH indicator from red cabbage juice and to test it with some common acids and bases.

Materials:
Chopped Red Cabbage
600ml Beaker
400ml Beaker
Test tubes
Tripod Stand / Gauze
Funnel
Clamp and Stand
Filter Paper
Common Acids / Bases

Procedure:

1. Chop cabbage into small pieces and place in 600ml beaker.
2. Cover cabbage with tap water, so that the beaker is ½ full of water.
3. Place beaker on the heating stand and heat with a blue flame. When the water starts to boil, reduce the heat of the flame, so that the water boils gently.
4. Boil for 10-15 minutes then allow the beaker and contents to cool.
5. Set up the filtration apparatus as demonstrated.
6. Filter the cabbage solution, collecting the solution in the 400ml beaker. Discard the remaining cabbage solids.
7. Pour about 2 cm depth of your cabbage indicator solution in to 4 test tubes. Add a few drops of one of the sample acid / base solutions to each of the test tubes and record the colour changes.
8. Wash and dry all you glassware and return all the other equipment to where you found it.