



FSP23

MEASURING SOIL pH

Teacher activity information

The Student Handouts that relate to these activities are found in the **Personal Dossier (FSP25)** under the section Soil characteristics.

Preparation

In the first activity you need to prepare three to four different soil samples – zip lock bags work well. Each soil sample needs to be quite different: sandy soil, clay soil etc. See below for simple method to make samples acid or alkaline.

Citric acid and bicarbonate of soda can be bought from the supermarket.

pH kits are available from gardening shops or pool shops. You can make your own red cabbage indicator (recipe below).

Before students get any of the soil wet they should examine the soil with a magnifying glass or hand lens.

Making the soil acidic or basic

Make sure at least two of your samples are treated.

- Spilt the soil you have got in half.
- Put each half in a separate icecream container.
- Temporarily name one container Soil A, and the other Soil B so you don't get confused.
- To Soil A add at least 1 teaspoon of citric acid per half cup of soil. Mix well.
- To the other container of soil (Soil B) add at least 2 teaspoons of bicarbonate of soda per cup of soil. Mix well and break up any bicarbonate lumps.

Preparing the universal indicator

- Universal indicator can be expensive. But for this exercise it can be watered down so that students don't use so much of the stock solution.
- Pour about half a cup of universal indicator into another container (keep in mind that it stains).
- To this add half a cup of distilled water (the stuff you put in your iron).
- You can now use this solution like normal universal indicator, but it is cheaper.

More information for teachers

What the students should find it that the sample with bicarbonate of soda will turn a shade of blue or grey blue.

The other sample with the citric acid will turn a shade of yellow/orange/red (depending on how much acid you added) indicating it is acidic.

The reason for the colour change is that the liquid universal indicator dissolves the bicarbonate or the citric acid and then reacts to the acid or base. If the citric acid and bicarbonate are not dissolving, then the universal indicator won't change colour. If this happens, add some water to the soil so it is damp. This can be done to the stock solution or as an extra step in your students are doing in the pH testing. If your results are still poor, add more bicarbonate or citric acid. Maybe the levels are too low.

Making indicators - red cabbage indicator

1. Cut up a few leaves of red cabbage.
2. Place them in a small saucepan and add enough water to just cover the pieces.
3. Boil gently in the saucepan for 10 minutes
4. Cool the mixture.
5. Pour off the liquid, leaving the solid behind.
6. Throw away the solid and keep the liquid.
7. Record the colour of the solution. It will be a purple-ish colour.
8. This solution will give one colour in contact with an acidic substance and another colour with a basic substance.
9. Keep the unused solution for later activities.