Soil pH testing
A way of introducing scientific practice into environmental education

In the English school system, geography as a curriculum subject dominates the delivery of environmental education. Society will need more environmental scientists in the future, so how we convince young people early in their learning journey that the scientific approach and understanding will be central to ensuring the future health of our planet?

A simple but effective way to bring practices into environmental education lessons, which can be easily identified by young people as science and has a clear environmental utility, is through using soil pH test kits.

Soil pH is a major control on which plants can grow where, often as result of affecting the availability of nutrients and the activity of decomposers. A slightly acid soil is best for the enabling growth of the widest range of plants. But, for crops such as cabbage, a highly alkaline soil can help prevent various fungal infections, which can badly affect profitability. Therefore, if you are a gardener or a farmer, knowing your soil pH can be very important. A farmer needs to know the crop they are planting will grow well in the soil available. A gardener may wonder why their favourite plant does not grow well. Knowing the soil pH enables both to make informed choices. Soil pH testing kits are available in a variety of forms from garden centres and web-based garden materials suppliers.

Figure 1: A typical soil pH testing kit sold for the gardening market. (*P Murphy*)

They all involve taking a soil sample, adding water and shaking for a minute or so, then adding a flocculent (usually Barium Sulphate) to ensure the soil particles clump together and sink, leaving a clear solution. The final stage is either adding an indicator solution or pipetting liquid onto indicator paper. The resulting colour is compared to a colour chart.

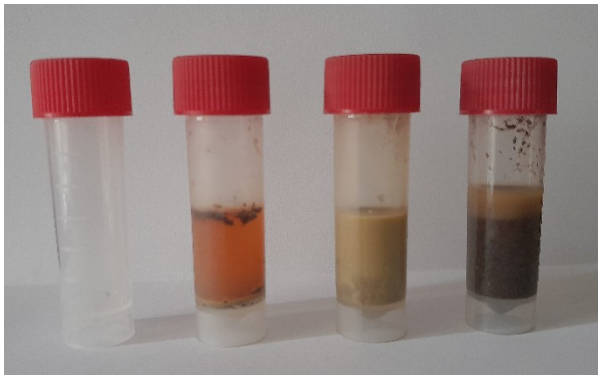

Figure 2: Typical soil pH testing results. Left to right – empty, acid, neutral, alkaline. (*P Murphy*)

The process involves sample selection to ensure it is representative of the local soil, measurement by volume of both liquids and solids, dissolving and comparison with an indicator colour chart – all activities usually undertaken in the science lab in a school. The kit components are easily recognisable as part of the material culture of a school science laboratory. If undertaken as part of a wider project, the results could inform planting decisions in the school grounds or other places. As these are consumer goods, they are subject to the legal requirements of the market place and come with health and safety information as required by consumer law. While this does not exempt the activity from the health and safety protocols of the organisation, it does make the teacher's life a lot easier when dealing with the paperwork.

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The back up
Title: Soil pH testing

Subtitle: A way of introducing scientific practice into environmental education

Topic: Testing the pH of soil using shop-bought kits

Age range of pupils: 10+ years

Time needed to complete activity: 60 minutes

Pupil learning outcomes: Pupils can:
- identify the pH of soil using simple kits;
- explain which plants will grow best in the soil tested;
- show that a scientific approach to environmental subjects provides useful data on which to base decisions regarding plant selection.

Context: This activity brings aspects of school scientific practice and material culture into the curriculum space assigned to environmental education.

Following up the activity: Students can undertake any of the Earthlearningidea activities on soils by typing ‘soil‘ into the Earthlearningidea search engine.

Underlying principles:

- Different plants (crops) thrive only in certain soil pH conditions.
- Simple and standard scientific testing can identify the pH of the soil and thus inform a correct planting decision, leading to improved growth and crop yield.

Thinking skill development:
The tools and techniques of science can be used outside the science laboratory and can be used to inform environmental decision making.

Resource list:

- Consumer facing soil testing kits – a range of styles and designs are available from garden plant and equipment suppliers.

Useful links:
British Society of Soil Science https://soils.org.uk/

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