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Forsinard Flows. Photo: Eleanor Bentall – taken from RSPB website

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**Activity 1 and 2 The pH of Peat Water *Technician Notes***

**Equipment List (per group)**

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| --- | --- |
| 5 boiling tubes and a rack | 2 rubber bungs, to fit the boiling tubes |
| 100ml measuring cylinder | A dimple tile |
| A dropping bottle of universal indicator & colour chart | 2 soil samples, A and B |
| Tap water | Distilled water |
| 3 teat pipettes | 2 funnels |
| 2 circles of filter paper | A spatula |
| Pen for labelling boiling tubes | A balance (for weighing the samples) |

**Soil samples**

Peat from a garden centre can be used for this experiment. However, its pH will have changed considerably due to treatment before packaging. We recommend use of compost from a garden centre following the recipes below, to produce one acidic and one less-acidic soil sample[[1]](#footnote-1).

**Soil recipes**

***Sample A*** *[peat-rich]:* Add 0.2g citric acid per 10g soil compost, moisten with a little de-ionised water, mix well.

***Sample B*** *[non-peat rich]:* Add 0.2g chalk per 10g soil compost, moisten with a little de-ionised water, mix well.

Check the pH of these samples before running the experiment in class – compost will vary by brand. The tap water pH will also vary across Scotland. For the purpose of the experiment the pH of the tap water should be higher than Sample A.

**Activity 3 Drinking Water and Peat Bogs *Technician Notes***

In this experiment the pupils examine the effect of organic acids on aluminium foil. They are asked to place several different foods on the foil and look at it a week later.

**Equipment List (per group)**

* a tray
* aluminium foil (a bit bigger than the tray)
* cling film (a bit bigger than the tray)
* a waterproof pen
* Sample A: a slice of pickled gherkin
* Sample B: tomato ketchup
* Sample C: yoghurt
* Sample D: a slice of lemon
* Ruler

**Activity 4 Peat Bogs and Water Level *Technician Notes***

In this experiment pupils to explore peat bog water levels using a model.

**Equipment List (per group)**

* A small plastic box with straight sides (e.g. Ferrero Rocher™)
* One piece of sponge A
* Two smaller pieces of sponge B (stored in water)
* A long piece of masking tape
* A 500ml beaker
* Tap water
* 50ml blackcurrant squash
* A waterproof pen
* Ruler

**Equipment notes:**

1. A small plastic box with straight sides is required – we used Ferrero Rocher™). Two different pieces of sponge are needed.

* + ***Sponge A*** is a normal sponge from any chemist. We used a car sponge.
	+ ***Sponge B*** is a ‘luxury sponge’ and can be found in most supermarkets. It goes very hard when it dries and is usually sold in a plastic bag, still damp. It will need to be hydrated before the experiment.

2. Sponge A and B should be cut to the same size and fit neatly into the box. There should be a gap between the sponges to make the water levels easier to see. Achieving all this will probably require:

* + A sharp knife to cut the sponges to size.
	+ Using two pieces of luxury sponge on top of each other.
	+ Taping the normal sponge into the box with masking tape.

3. The squash is used to colour the water. Food colouring would work but can stain clothing.

***Plastic box***

***Coloured water***

***Sponge A***

***Sponge B***

**Activity 5 Carbon Dioxide and Peat Moisture *Technician Notes***

This experiment explores the relationship between moisture levels in peat and carbon dioxide release by decomposers.

## *Equipment list (per group)*

* 2 x 5L plastic bottles with wide necks and their lids
* Peat rich compost (about 8 litres)
* A wide funnel
* A scoop or spoon
* Carbon dioxide sensor and datalogger
* 100ml measuring cylinder
* Tap water
* A4 sheet of card (to use as a fan)
* Labels
* Pen

**Equipment notes:**

* 2 x 5L plastic bottles need to be see-through, have necks that the carbon dioxide sensor can go through, and lids. They need to be very clean and left to stand open for several hours before the experiment. It is best to avoid bottles that contained fizzy/carbonated drinks.
* The higher the peat content of the compost the better. It should be possible to obtain this from a garden centre[[2]](#footnote-2)*.* Consider health and safety issues when using organic materials. The peat compost needs to be fairly aerated. It is therefore advisable to open any new bags of peat to be used, 24 hours before the experiment.
* Carbon Dioxide sensor and datalogger. How the measurements are taken and stored/used by the pupils will depend on the datalogger and sensor which you have available. However the seal quality during measurement is crucial. If you have a probe shaped sensor you will have to mount it within something that stoppers the bottle – such as a rubber bung. We suggest a paperweight for a flat sensor. The measurements should be in the range of 1,000 to 10,000 ppm for this experiment. Some sensors have two settings, so set the sensor to ‘10,000’ rather than ‘100,000’. Human breath will affect readings of this sensitivity. It may take up to 2 minutes for the sensor to adjust to a given atmosphere.
1. Peat from a peat fuel briquette should produce an acidic pH. You may need to soak the briquette peat for 24 hours before testing the pH. This is because the peat in briquettes is highly compacted and dehydrated. A sample from an actual peat bog should also work. In both cases, health and safety issues should be considered, and legal issues in the latter case. [↑](#footnote-ref-1)
2. Fresh peat from a peat bog also works, however consider legal issues. [↑](#footnote-ref-2)