In this inquiry you are going to investigate the pH or acidity of the soil

(The pH scale runs from 0-14. An acid soil has a pH of less than 7 whereas an alkaline soil has a pH higher than 7. pH controls whether the plants can absorb any available chemicals in the soil. pH 6.5 is the ideal average value.)

Key questions to ask

1. **Why are some soils more acidic than others?**
2. **How do different plants affect the acidity of the soil?**
3. **Does the slope angle affect the acidity of soil?**
4. **How do people and livestock change the pH of the soil?**

In the classroom

Test each soil sample for pH:
Put in white barium sulphate powder. Put soil from sample in to a depth of about 3 cm. Add distilled water (approx 2 cm) Add indicator drops. Put the cork in and shake well. Allow to settle for 10 minutes. Compare the colour of the clear area at the top with the colour card to find out the pH to the nearest 0.5 of a unit

Equipment- Booking sheet, base map, clinometer, tape measure, freezer bags, marker pen, trowel, soil auger, universal indicator solution, soil testing kit

Follow up work - Plot the pH results on a map of the farm
Draw graphs to show the slopes, pH and soil depths
Draw scatter graphs to show slope angle and acidity, soil depth and acidity.

Explaining the results

1. **In which fields were the highest and lowest pH readings recorded?**
2. **Is there a link between the slope angle and acidity?**
3. **Is there a difference in pH readings between the fields with grasses and those with bracken and other plants?**
4. **Does the soil pH increase or decrease where the land is poorly drained?**
5. **Did the fields with deeper soils have higher or lower pH readings?**
6. **How might the farmer affect pH readings?**

True or false:

1. **Steeper slopes tend to have lower pH readings**
2. **Lower pH readings occur in boggy or waterlogged areas**
3. **Fields with bracken tend to have lower pH readings**
4. **Fields that are regularly farmed have higher pH readings**
5. **Well drained slopes on gently sloping land have higher pH readings**
6. **Soils on the highest and most exposed parts of the farm tend to have the lowest pH readings.**

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Notes for teachers:

All the soils on the farm are naturally acid, thanks to parent material (granite) with little clay and low base status and high rainfall. The permanent grassland sites (farmed soils) are slightly or moderately acid with pH values varying from 4.8-6.9. In the past, lime was added to the soil in the form of calcified seaweed and the scattering of ash. The more natural sites tend to have lower soil pH readings. The most acidic sites are in the north on the steep ground in Stepfield and Watt's Coombe (3.9 and 4.1)

According to soil tests carried out in 2005 the pH values for the fields recommended for the transect were as follows:

- ***Coombe Park 4.4, 4.5, 4.7 (Bog)***
- ***Potato plot 5.2 (Rushes)***
- ***South Park 4.9***
- ***Bovetown 5.4***
- ***Great-a-Park 6.7-6.9***
- ***Harpers Down 5.6-5.7***
- ***Stepfield 3.9-4.1***

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