1. Methane (CH₄) – why is it important?
   • Methane absorbs energy in the form of infrared radiation reflected from the Earth's surface and reduces the amount escaping into space. This is the greenhouse effect which warms the planet.
   • CH₄ concentration in the atmosphere has risen from around 700 parts per billion (ppb) in 1750 to 1860 ppb at present.
   • This rise in atmospheric concentration is contributing to climate change.
   • CH₄ is produced in wetland soils and closed landfill sites where there is no oxygen present (anaerobic environments).

2. The Tree Methane Pathway
   • Trees can contribute to CH₄ emissions from wetlands as they provide a pathway from the soil to the atmosphere through the roots and stems.
   • This route of CH₄ emission could be highly significant because it bypasses bacteria in the uppermost, aerated soil layer which would otherwise break the CH₄ down.

3. Aims – applying the tree methane pathway to landfill
   **Quantify emissions:** do trees on closed landfill sites in the UK emit CH₄ from their stems?
   **Spatial variations:** do CH₄ emissions vary with stem height?
   **Temporal variations:**
     - do CH₄ emissions vary seasonally?
     - do CH₄ emissions vary between closed landfill sites with different management histories?
   **Species variations:** do different tree species emit varying amounts of CH₄?

4. Quantifying CH₄ Emissions
   • Data will be collected from closed landfill sites in the UK which have woodland areas.
   • Chambers will be secured around the tree stem and connected to an Ultraportable Greenhouse Gas Analyser (Los Gatos Research).
   • The greenhouse gas analyser will measure the concentration of CH₄ in the chamber.
   • This can be used to determine the amount of CH₄ emitted or taken in by a tree over time.

Applying the tree methane pathway to trees on closed landfill sites will determine whether they are taking in CH₄, thereby mitigating the effects of landfill gases, or amplifying the effects by channelling emissions from the waste.