

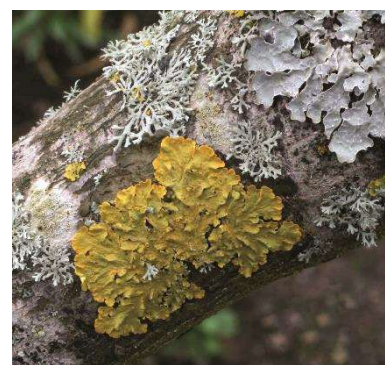
Short activity: How polluted is your air? Using lichens growing on trees as indicators of air quality



Human activities such as road transport and livestock farming can produce air pollution rich in nitrogen-containing compounds (such as nitrous oxides and ammonia). As well as potentially affecting human health, nitrogen pollution can alter the growth of plants and fungi. Although moderate levels of nitrogen stimulate the growth of most plants and fungi (a fertilisation effect), high levels can reduce the growth of sensitive species. In this activity, we will use lichens as indicators of air quality.

What are lichens?

Lichens are made up of two organisms living together: a fungus (providing the home) and an alga (providing the food). Lichens are sensitive to the amount of nitrogen-containing pollutants in the air. Some species of lichen are tolerant of nitrogen pollution, whereas others need very clean air to survive. This means lichens can be used as **bio-indicators** (living indicators) of pollution levels. By looking at which species of lichen are growing in the area, and how abundant they are, we can work out how polluted the air is. In this activity we will be looking for lichens on trees.



A lichen hunt

Select a suitable location: First select an appropriate site for the lichen hunt. Try to select deciduous trees such as Oak, Ash or Sycamore (you can use the OPAL Tree Identification Guide to help you). Avoid coniferous trees and trees that are heavily shaded or covered in ivy. Please also ensure that appropriate health and safety procedures have been followed.

Before you begin the lichen hunt: Provide OPAL Lichen ID Guides to the groups taking part, ideally with at least one ID guide between three participants. In this hunt we are interested in looking for the nine different lichen species detailed in this guide. These species are grouped into three categories (nitrogen-sensitive, intermediate and nitrogen-loving) depending on how their growth is affected by nitrogen pollution. Ask pupils to note down which species they find as they go along.

Start the hunt! Set your class off searching for lichens! In practice we have found that such activities work best when pupils are divided into small groups (around three per group).

What do your findings mean?

The lichens in the OPAL Lichen ID guide are known to respond to the levels of nitrogen in the air. If your trees are dominated by nitrogen-sensitive lichens (like *Usnea* and *Evernia*), the air is likely to be relatively unpolluted. However, if they are dominated by nitrogen-loving species (like *Xanthoria* and *Physcia*), the air is likely to have high levels of nitrogen oxides or ammonia.

What next?

This activity is based on the OPAL Air Survey. We hope you enjoyed this activity and recommend taking part in the OPAL Air Survey! For more information about the OPAL Air Survey (and other OPAL surveys), please visit the OPAL website at www.opalexplornature.org.