Before you start the survey please refer to the workbook where you will find more detailed instructions and background information.

Record the workbook any insects or other creatures you find in the tree during your survey.

Air pollution

We are particularly interested in two types of pollution which contain nitrogen: ammonia and oxides of nitrogen (nitric oxide and nitrogen dioxide).

Living conditions

Living conditions can cause harm to human health, food supplies, water quality and biological diversity.

The O PAL Air Survey

The O PAL has two parts:

1. Activity 1
2. Activity 2

You can find out more about the O PAL website (www.airquality.co.uk) where you live or national maps for pollutants.

What to do in an emergency

We don’t advise you to work on your own. Take a responsible friend who can help with your survey, and in case things go wrong. Make sure that you know what to do in an emergency. Look out for low-hanging branches and falling branches. Take care to avoid twigs in the eye, and be sure not to damage any tree, its twigs or branches.

The survey starts here

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About the Air Survey

By joining in the O PAL Air Survey, you will be helping to build up a detailed picture of the levels of air quality in your local area and across the country. The O PAL Air Survey has two parts:

1. Activity 1
2. Activity 2

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Lichens on trees

Why lichens?

Lichens are often looked upon as being sensitive indicators of air quality. They are used in the past to show major atmospheric pollution from industrial and domestic sources. Today, lichens occur widely in towns, cities and countryside, on a diverse range of surfaces and materials to plateaux and woody trees. This will help us find out how lichens are being influenced by current environmental conditions.

Indicator lichens we are looking for

Lichens are found on trees that can be used as indicators of local air quality. We know that some lichens are sensitive to nitrogen-based forms of ammonia or nitrogen dioxide, (called nitrogen-sensitive lichens), and that they are unable to survive in areas with high levels of such pollutants. Others show their sensitivity to levels of nitrogen compounds ('nitrogen-loving' lichens). Lichens can also be found in both clean and polluted conditions, helping us to assess indicator lichens across the country.

Lichens on trees

Lichens on trees will vary with bark type and the age of the tree, as well as local air pollution and climate. Lichens on the trunks of older trees may be more abundant, levels of nitrogen-containing pollutants are likely to be higher.

Labelling your tree

You do not have to carry out the tar spot survey if you are not interested in the nine indicator species shown in the ISpot website. You can find more information and help with identification on the O PAL website.

End of Activity 1

Record your results in the workbook (pages 6–7) as you carry out your survey, and do not forget to enter them into the O PAL website at the end.

Activity 2: Lichens on trees

1. Record the total amount of indicator lichens you see on the side of the trunk you have chosen as follows:
   - None (this is an important result)
   - Small amount overall (amounting to less than 1/2 of a A4 sheet of paper in total)
   - Medium amount overall (amounting to between 1/2 up to one A4 sheet in total)
   - Large amount overall (more than one A4 sheet in total)

2. Count how many other types of lichen there are.

3. Record the presence of indicator lichen species which were not present when you looked.

4. Record leaf information

5. Take specimen samples from each tree. Record for each leaf:
   - the number of spots, including any yellow or brown patches
   - the width of the leaf (in cm) and its widest part
   - the length of the leaf (in cm) and its widest point

6. Complete your survey

Upload your results to the O PAL website www.OPALExplorature.org

There is a map on the O PAL website to help you find your location and postcode.

What do your results mean?

Activity 1 and 2 give you new information about species that are sensitive to different types of air pollution – ammonia from intensive farming and nitrous oxide from fossil fuel combustion and smoke from heavy industry.

For lichens, you enter your results on www.OPALExplorature.org, a score is calculated which can be compared with a national scale.

Where there are plenty of nitrogen-sensitive lichens on tree trunks, there is likely to be an intensive farming, dense traffic or heavy industry.

In contrast, areas where nitrogen-loving lichens are more common, levels of nitrogen compounds in the air are likely to be lower.

Many factors affect the performance of fungi, including climate and air pollution. Studies have shown that the spot fungus is reduced by a lack of nitrogen in the soils. There are also differences in the performance of fungi that means that there are more tar spots. It is therefore important to check the level of these pollutants before surveying any area.

To complete your survey (Page 8 in the workbook)

Site characteristics

Decide on a 3-square metre site, use the enclosed Tree Guide to help you. There is no need to rely on the leaves. Other clues could be a discoloured patch on the trunk or collect fallen leaves from under the tree. You do not have to do your next survey in the same place as the lichen survey.

Answer Questions 1–5.

Tree characteristics

Record for each surveys:
   - the height of each trunk (m above ground level)
   - the number of fallen leaves, 0 = no fallen leaves, 1 = a small amount of fallen leaves, 2 = lots of fallen leaves

End of Activity 2

Note: A tick in the box means that the site characteristic matches or is getting closer to that shown on the map on the O PAL website. The leaf on the Tar spot of sycamore leaf shows that tar spot fungus is reduced by a lack of nitrogen in the soils. There is no need to rely on the leaves. Other clues could be a discoloured patch on the trunk or collect fallen leaves from under the tree. You do not have to do your next survey in the same place as the lichen survey.

www.OPALExplorature.org