## National Curriculum links

**Living things:** Recognise that environments can change and that this can sometimes pose dangers to living things.
**Working scientifically:** Identifying differences, similarities or changes related to simple scientific ideas and processes.

## Lesson Aim

To acquire the skills needed to perform a lichen study.

## Lesson objectives

Pupils will:

* Identify characteristics and describe different locations
* Measure and record the circumference of a “tree trunk” and record this measurement in cm / inches
* Identify a selection of different lichen and identify them as either nitrogen-loving, intermediate or nitrogen-sensitive

## Resources required

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| ***Activity 1: Describing area characteristics*** | ***Activity 2: Measuring the circumference of a tree trunk*** | ***Activity 3: Lichen identification*** | ***Activity 4: Make a pollution catcher*** |
| * Site images
* Site labels
* Site characteristics worksheet
* Pencils
 | * Cloth tape measures
* Pencils
* Tree characteristics worksheet
 | * Lichen identification guide
* Hand lens
* Lichen images - Group A and Group B
* Lichen labels
* Lichen twig samples
* Lichen identification tally sheets
 | * Pollution catcher print out template
* Pollution catcher 1st draft template
* Marker pens
* String
* Hole punch
* Scissors
* Vaseline / petroleum jelly
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## Introduction

This session will prepare pupils to lead a local lichen study. Pupils will learn the skills they need to primarily identify a selection of nine lichen, which form the Opal lichen study. They will learn the differences between lichen that are nitrogen loving, nitrogen-sensitive and intermediate. Pupils will describe the characteristics of their study area, measure the circumference of the trees they will be studying and will finish the session by making their own pollution catcher to use at school.

## Group / Class activity

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| **Timings** |  **Activities** | **Notes / resources** |
| **5 mins** | **Introduction**This session is all about learning the skills needed for a group of children to perform a lichen study. The children will perform 3 different activities that will help to familiarise them with the processes of a lichen study. |  |
| **10 mins** | **Activity 1: Describing area characteristics***Working in groups*Explain to the children that part one of the Lichen study involves describing the study area’s characteristics. Explain that we need to start thinking about characteristics of the area.**1a: Label areas**Ask the children to match up the description labels with the area images.**1b: Site characteristics worksheet**Ask the children to complete the worksheet, using the images with descriptions that they labelled in the previous task. The children should go through each labelled site at a time and think about which area characteristics you would expect to find close to each of the areas described. Tick the boxes that are relevant for each site. Go through the city site as an example first. | Site imagesSite labelsSite characteristics worksheetPencils |
| **10 mins** | **Activity 2: Measuring “tree trunk” circumference***Working in pairs*Explain to the children that an essential part of a lichen study is to study the right part of the tree. For the lichen study you will need to focus just on the lichens between 50–150 cm above ground level. You will work in pairs and take turns taking measurements and being the practice “tree trunk”.**Role 1:** Pretend tree trunk - hold arms up high and stay still**Role 2:** Measure 130 cm from the ground up to around waist height. This is where you will measure the circumference of the tree trunk. Ask ‘tree’ to put their hand in line with the 130 cm marker. Now take the tape measure and measure the circumference (around the outside) of the ‘tree’ i.e. your partner’s waist.Record this measurement in cm / inches in the tree characteristics worksheet. Names do not need recording. Swap roles with your partner. | Tree characteristics worksheetPencilsTape measuresWhite board and markers could be useful for demonstrating and explaining which part of the tree trunk is the right bit to measure. Might be useful to label this on the board. |
| **15-20 mins** | **Activity 3: Lichen Identification***Working in small groups or pairs*The most important part of the lichen study will be identifying different types of lichen that we find. For this study we are looking only for nine different types of lichen. There are hundreds of species. We want to find certain types because they tell us important information. Go through the nine types of lichen that we are looking for as part of the study. Point out some of their features from the descriptions given in the lichen study guide. Explain to the children that we will now try and identify some lichen ourselves.1. Using the lichen identification guide label the nine lichen images in Group A. Go through answers.
2. Using the lichen identification guide try to identify the different types of lichen you can see in the Group B images. There might be more than one type of lichen in each picture. If this goes well, ask the children to use the lichen identification tally chart to tally the number of different lichens found. Ask the children if the results suggest anything about the location Group B lichens were found. Feedback their thoughts to the rest of the class.
3. Give each group a twig with lichen on it and ask them to try and identify any of the nine lichen we have been looking at. Feedback to the class.
 | Lichen twig samples (if using)Lichen identification guide enough copies per groupLichen images Group A and Group B (enough for one set per group)Hand lenses / magnifying glasses |
| **10 mins** | **Extension: Activity 4: Make a pollution catcher**This short activity allows the children to very quickly plan their own air pollution investigation. Firstly, explore with the children where they feel air pollution can be worst and identify it’s causes. Answers will include: busy roads (cars, vehicles etc), cities (factories, houses, vehicles) etc… Now ask the children to think about what place might have little or no air pollution and it’s causes. Answers will include: the countryside (farm machines, farm animals), woodland (little or no air pollution), parks (roads close by), gardens (roads close by) etc.Explain what the air pollution catchers do and how they work. Ask the children to think of as many places that are quiet / busy around the school site that they could use to hang up the pollution catchers - make a list.**Making pollution catchers:**1. Draw a large outline in marker on the waterproof paper template (using up as much space as possible) and hole punch the top and bottom. Thread a long length of string through the holes at the top and bottom.
2. When ready to hang up and start the investigation - colour in the outline shape with Vaseline or petroleum jelly.
3. Hang up catchers and leave up ideally between 2-3 weeks. Take down and analyse results. You should find that there is a difference between catchers, depending on where they have been positioned. I.e. In busy places there should be more pollution / dust attached and in quieter places there should be less.
 | Marker pensWaterproof paperPllution catcher templatesBoard / note books to make a note of where pollution catchers will live Vaseline or petroleum jellyHolepunchString |
| **5 mins** | **Plenary**Ask the children to feedback the different jobs they have been doing today and ask them if they found anything tricky or difficult. If so, additional support can be put in place for the lichen study. Explain to the children that next time we will be doing the real thing. Children will need to come prepared for an outdoor activity and appropriately for the expected weather. |  |