

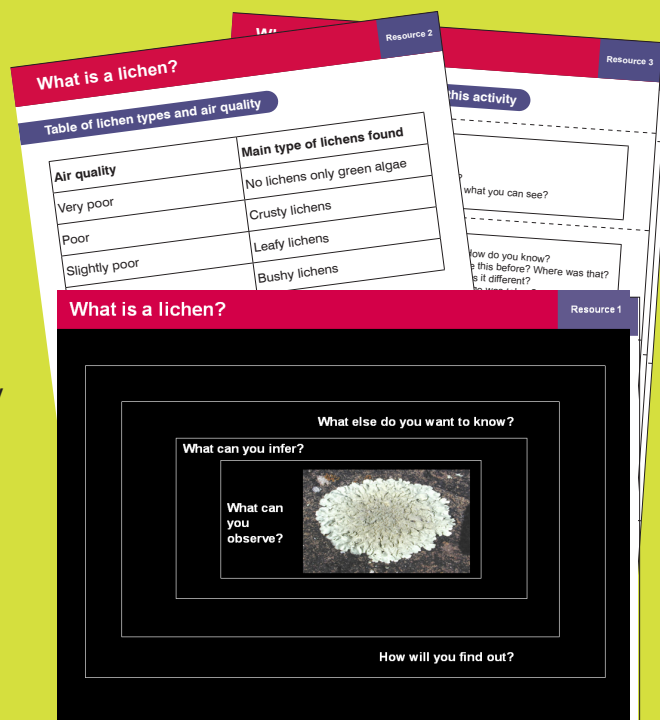
What is a lichen?



Bridgend Outdoor Schools
Ysgolion Awyr agored
Pen-y-Bont ar Ogwr

What is a lichen?

Learners are invited to interrogate the image. The questions posed develop learners' skills in the areas of observation, literacy, critical and creative thinking as well as research. They are expected to formulate 'good' questions in order to ensure that the science they use is logical, reliable and accurate. Findings are gathered through researching their own questions and drawing their own conclusions. Learners present their findings in a two minute presentation to the class. Then, they carry out a lichen survey to decide upon the quality of air in their local outdoor space and write a letter to a local newspaper describing their findings.



Opportunities to develop

LNF

Literacy

Oracy across the curriculum: Developing and presenting information and ideas.

Reading across the curriculum: Locating, selecting and using information, Responding to what has been read.

Writing across the curriculum: Organising ideas and information, Writing accurately.

Numeracy

The numeracy skills that could be evidenced by learners when carrying out this activity are lower than that required in the LNF for this age group and therefore are not noted here.

Curriculum

KS3 Science

Skills - C1,2; EP 3, 5; ED2, 3, 4, 5; ER2

Range – IO6

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Resources

Resources included with this activity

- 1 PowerPoint slide as a source square.
- 2 Table of lichen types and air quality.
- 3 Suggested questions in sets, relating to each section of the source square, which can be given to each pair as they start each section. Conversely, these questions can be used by the teacher.

Resources that need to be made available

Learners will also need a means of classifying lichens, at least into the three types of Bushy, Leafy and Crusty. A key can be found on the British Lichen Society's website at: <http://www.thebls.org.uk/sites/default/files/files/Which%20lichens%20can%20you%20find.pdf>. In addition, a worksheet to carry out a simple lichen survey and the means for learners to report their findings nationally can be found on OPAL's website at <http://www.airsurvey.org/>.

Risk assessment

Prior to carrying out outdoor activities, please read [Assessing risk in outdoor spaces](#) (hyperlinked). You will need to follow your own school's health and safety guidelines and subsequently make your own risk assessments that directly relate to the outdoor space that you are going to use. In addition, although most lichens are edible in the UK there are a couple that are poisonous. Therefore ask learners not to touch the lichens they find, and if they do so to wash their hands thoroughly afterwards.

How to run the activity

Preparation

Learners will need some prior knowledge of fungi and algae, although this could be quite limited in that they only need to have an idea as to what these are.

Print the PowerPoint slide onto A3 paper, enough for one between 2-4 learners. Print off the key, if required, and the table of lichen types and air quality.

Doing the activity

Invite pairs or small groups of learners to interrogate the image by answering the questions surrounding it. Ask them to discuss their ideas, making sure that they explain the reasons for their ideas and write them in the relevant parts of the source square.

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Task 1: Observing the source square

Start at the centre of the source square and ask learners to look very closely at the image and just describe what they can see. Some learners find this very difficult and start to guess/infer – try to keep the learners focused by asking questions such as:

- What shape is that?
- What colour is it?
- What else can you see?
- How could you describe what you can see?

Task 2: Inferring

Ask learners to start to link what they can see to what they think the image might be about. Questions such as:

- What does that look like? How do you know?
- Have you seen anything like this before? Where was that? How was it similar? How was it different?
- Where do you think this image was taken? Why do you think that?

Task 3: Formulating questions

Prior to this activity, learners will need to understand how to formulate quality questions. As they are formulating questions, ask them to share them with the group and work out how best to phrase them. You might like to ask questions of the learners such as:

- What exactly do you want to know?
- What 'starter' words can you use for formulating questions? Which are the best? Why?
- Is that a clear question for someone else to understand? Why?
- Is that an easy question to answer? Does that make it a good question? Why?
- How could you phrase that question to make it more open? Why might that be a good idea?

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Task 4: Preparing to research

Most learners at this point will come up with generic answers as to how they will research their answers; answers such as 'on the internet' or 'in books' or 'go to the library' are very low level. To try and move learners away from such answers, ask them to link each of their questions to the best method for finding the answer. When they come up with 'the internet' ask them questions such as those below and get them to write out their answers in full on the source square:

- Which search engine will you use? Why have you chosen this one?
- What search terms could you use? Which are the best? Why?
- What type of sites will be the best to look at, why?

If the learners choose books or libraries, ask questions such as:

- What type of books will you look for? Why?
- In what section would these books be in a library? How do you know?
- How should you use a library system? How do you know this?
- How should you use an index? How do you know?

Task 5: Researching

Learners will need to decide how they are going to present the information they find. Make sure that they know they will only have two minutes to present as this will ensure that they don't include too much erroneous information and push them towards having a clear understanding of their answers. This will help them to develop good précis skills. You might wish to ask questions of the learners as they are researching, such as:

- Which web sites are you going to use? Why use those ones?
- How do you know that information is reliable?
- Could that information be biased? Why do you think that?

Task 6: Presenting

As learners present to the class try to ensure that each presentation is accurately timed by using a stop watch or a countdown counter on the whiteboard. Give an 'only 30 seconds left' warning so that the presenter has time to summarise. You could ask learners to peer or self-assess against their own success criteria for good presentations, which could be from earlier work or generated prior to their own presentations.

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Task 7: Lichens as indicators of air pollution

Lichens have been used for many years as pH indicators in litmus paper. They can also be used as indicators of air pollution. Ask learners to draw a sketch map of their outdoor space and label the compass co-ordinates and the prevailing wind direction. Within the space, ask them to either concentrate on the trees or large rocks, depending on which are prevalent in the outdoor space. They would need to note on their map the position of the larger trees and or rocks.

Then, to note and mark on their map the position of each type of lichen (bushy, leafy or crusty) they find on trees/rocks. It is important that they note on which side of a tree/rock they find a particular type of lichen.

Once back in the classroom, give learners the table of type of lichen and air quality (Resource 2). Ask groups of learners to pool their findings and to discuss:

- What type of lichen did you find the most of? Why do you think there were more of these? What does this tell you about the air quality?
- Is just counting the number of each type of lichen enough to give you firm conclusions about the air quality? Why? What could you do to ensure you made firm conclusions?
- Where did you find most leafy lichens? How were leafy lichens distributed in terms of compass directions? How were leafy lichens distributed in terms of the prevailing wind? What does this tell you?
- Where did you find most bushy lichens? How were bushy lichens distributed in terms of compass directions? How were bushy lichens distributed in terms of the prevailing wind? What does this tell you?
- Where did you find most crusty lichens? How were crusty lichens distributed in terms of compass directions? How were crusty lichens distributed in terms of the prevailing wind? What does this tell you?

Ask learners to draw their own conclusions from their findings.

Task 8: Letter to a local newspaper

Learners should now have conclusions as to the air quality of their local outdoor space. Ask them to use these conclusions to write a letter to a local newspaper describing their conclusions and highlighting any issues with air quality they have noted. They could question whether, for example, a local industry is polluting the air in the vicinity of the school. Conversely, they could praise the local air quality and thank either local or distant industries (dependent on prevailing winds) for ensuring air quality is good.

- What have you found out from your lichen survey?
- How are your findings linked to local or more distant industries? How do you know?
- How can you express your findings in a letter?
- What are the main points you wish to include? Why are these your main points?
- What emotive words are you going to use? Why?
- What scientific terms are you going to use? Why?
- How might using science specific terms help you to get your points across?
- What do you know about letter structure and format? How do you know these things?
- How will you format your letter?
- Will your letter be handwritten or typed? Why?

If you wished to develop the ideas of air pollution further, you could look at the differing gases produced from local industries, how their release is minimised and what effects they could have on the environment.

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Assessment against the LNF

Many aspects and elements could be demonstrated by learners as they carry out this activity. The main focus areas of the activity within the LNF are shown as shaded boxes in the tables below.

Literacy		
Strand	Element	Aspect
Oracy across the curriculum	Developing and presenting information and ideas	Speaking
		Listening
		Collaboration and discussion
Reading across the curriculum	Locating, selecting and using information	Reading strategies
	Responding to what has been read	Comprehension
		Response and analysis
Writing across the curriculum	Organising ideas and information	Meaning, purposes, readers
		Structure and organisation
	Writing accurately	Language
		Grammar; Punctuation; Spelling; Handwriting