

Scientific Enquiry Materials

KS2

AROUND ABOUT MY SCHOOL



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Contents

My special area	4
Comparing environments	6
Before and after	8
Safety hazards	10
Change for the better	12
Signs of Spring	14
Lichen	16
Travelling to school	18
School playing fields	20
Wind farms	22

Levels 2–5

Resources

- ▶ Enquiry Sheet – My special area
- ▶ digital camera
- ▶ mp3 player, microphones



Links to skills in the Science PoS

Pupils describe important features in their local environment, using any suitable mode to present their data. They will be encouraged to reflect on and compare the various criteria different pupils have brought to the same challenge.

My special area

Overview

This activity encourages pupils to observe their local environment and consider what special features it possesses that make it different from other environments. They are asked to draw a sketch map and compare their judgment of what makes their area special as compared with what their peers judge to be special or important.

Activity

Discuss with the pupils what they understand by the term 'environment'. Some might think in terms of community and people, others will think of buildings and places. Ask groups of pupils to discuss what is special about the area around their school compared with other schools and places they know.

To focus on science they might be encouraged to think about:

- ▶ sights, smells and sounds;
- ▶ natural landmarks, e.g. rivers, hills; animals and plants;
- ▶ things being made, grown, built or bought and sold.

They could take digital photographs or sound recordings of the area around school to show things that make their local environment different to other environments.

Ask the pupils to draw a sketch map (i.e. freehand, without too much concern about scale) on the Enquiry Sheet to show their school and the surrounding area. They could label their map to show the things that make the place special. Arrange a class discussion in which pupils share ideas with the rest of the class. Focus on the common features the pupils have chosen to include and encourage them to use different ways of presenting information.

Suggested questions

What are the sights, smells and sounds in your special area?

What are the natural landmarks in your special area?

What makes this area special to you?

Can you think of other parts of Wales that are very different from your special area?

Supplementary activities

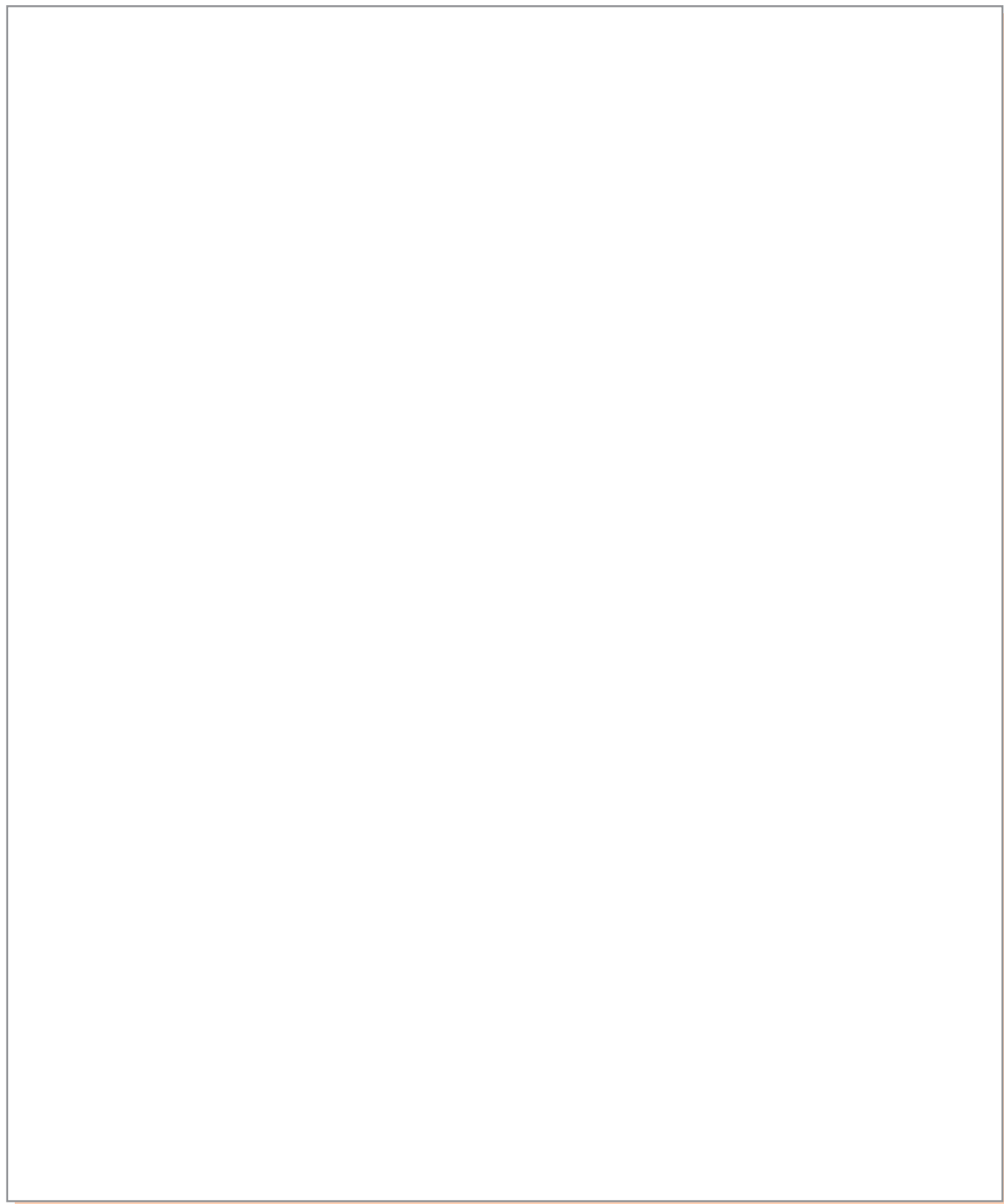
Pupils could find out what is special about the place around a contrasting school in their county, in another part of Wales or further afield. (Some schools might already have established links with other schools in contrasting areas, that they could use to compare local environments).

Working in groups, discuss what is special about the area you have chosen.

Draw a sketch map to label your school and the surrounding area.

Show the things that make the place you have chosen special.

Label your map.

A large, empty rectangular box with a thin black border, intended for drawing a sketch map. The box is positioned below the instructions and occupies the central portion of the page.

Levels 2–5**Resources**

- ▶ Enquiry Sheet – Comparing environments
- ▶ Internet access
- ▶ books

**Links to skills in the Science PoS**

This activity is predominantly about using appropriate sources to search systematically for information to meet a specific purpose. Pupils are then expected to analyse, compare and reflect upon the range of similarities and differences in their own and others' data.

Comparing environments**Overview**

This activity invites pupils to compare their local environment in terms of flora, fauna, habitats, materials or industry with other parts of Wales.

Activity

Ask the pupils to compare their local environment with other parts of Wales. The table on the Enquiry Sheet suggests some features that they might compare, but there might be others more relevant to their particular locality. Encourage pupils to talk about their ideas first and then use the Internet, books or CD-ROM to find relevant information about other parts of Wales.

Suggested questions

What different types of animal have you seen around here?

Do you think these animals will be found in other parts of Wales?

Which habitats are you including?

How will you find out what natural materials are to be found near our school?

Are any resources or goods produced by people near our school?

Supplementary activities

Pupils could make a digital video of their local environment that illustrates some of its key features.

Pupils could record interviews with local people to show changes in land use, building, manufacturing, conservation, etc.

The table shows some questions that might help you compare your local environment with other parts of Wales.

In pairs, discuss your ideas first and then check out some of your ideas by finding information using the Internet or books.

A space has been left for you to add your own question.

question	in our local area	in other parts of Wales but NOT in our local area
What animals are seen?		
What different kinds of habitat are there?		
What natural resources are there?		
What goods are produced locally?		
.....		

Levels 3–5

Resources

- ▶ Enquiry Sheet – Before and after
- ▶ cameras
- ▶ Internet access
- ▶ oldmaps.com



Links to skills in the Science PoS

This activity places an emphasis on identifying, describing and explaining trends and then using these trends to assist in predicting the future. Communication of these predictions across the class will offer opportunities for making and checking the evidence for and against predictions.

Before and after

Overview

This activity encourages pupils to consider how the things that make their local environment different from other environments might change over time.

Activity

Ask pupils to look at old photographs of the area and then look at the things around school that they photographed in the activity 'My special area'. They should think how this area has changed and how it will change in the future. The pupils could record their ideas on the Enquiry Sheet. Pupils could discuss the possible causes of change and estimate the timescale for different changes.

Suggested questions

How do you think the place around school will look in 25 years time?
 What do you think the environment will look like after that?
 What things do you think will change and what do you think will be the same?
 Why will they change?
 What different things may cause that change?
 What may happen that could slow down some of the changes?
 What may happen that could speed up the changes?

Supplementary activities

Pupils could search in their local library or Internet for information about the local environment in the past.

Add your drawings or photographs to this sheet.

My special area years ago:

My special area now:

My special area in 25 years:

Levels 4–5

Resources

- ▶ Enquiry Sheet – Safety hazards
- ▶ digital camera



Links to skills in the Science PoS

There is a very clear focus on the planning skill of identifying hazards and risks to themselves and others in this activity. Making objective assessments of such hazards requires considered opinion and anticipation of cause and effect. The activity also requires reflection and evaluation of the degree of hazard posed.

Safety hazards

Overview

This activity requires pupils to identify any safety hazards in their local environment and then to consider the risks these hazards pose to people's safety. Pupils' arguments might take account of how risks can be minimised.

Activity

Ask pairs or groups of pupils to think of hazards in and around school. They could draw or write about each hazard on the Enquiry Sheet. Alternatively, they could take a photograph of each hazard or record them on video.

The pupils should consider the risk to safety posed by each hazard and using a scale (1 = low risk of harm, 4 = high risk of harm) they could rate each hazard. In doing this, they should consider how their own actions might help to keep them safe. For example, knives used at lunchtime might be a hazard but they carry a low risk of accident in the school hall.

Suggested questions

Can you think of all the places in and around school that could be safety hazards?
What makes you think that is a high risk to safety?
What can you do to reduce the risk?

Supplementary activities

Pupils could make a video film or an animation to present the hazards and show how the risks to safety might be minimised or increased.

Draw and write about some hazards to your safety in and around school. Choose a number to rate the risk to your safety (1 = low risk of harm, 4 = high risk of harm).



low risk **1 2 3 4** high risk



low risk **1 2 3 4** high risk



low risk **1 2 3 4** high risk



low risk **1 2 3 4** high risk

What could you do to reduce the risks that you have rated 3 or 4?

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Change for the better

Links to skills in the Science PoS

Pupils will need to plan the collection of relevant information, informed both by their science knowledge and through exploring secondary sources of information. Exchanging outcomes with peers will enable them to reflect upon their methods and conclusions.

Change for the better**Overview**

This activity encourages pupils to consider sustainability, health, pollution and protection of natural resources in their local environment.

Activity

Explain to the pupils that the Enquiry Sheet suggests some areas in which they might like to see improvements in their local environment.

Ask pupils to discuss in pairs how changes in the environment could help to achieve these improvements. They might share ideas before committing their ideas to the Enquiry sheet.

For each improvement they should discuss:

- ▶ the changes they would like to see;
- ▶ how these changes could be made to happen;
- ▶ how long it would take to achieve the improvements;
- ▶ how they would measure or observe the results;
- ▶ why they would like to see the changes.

Suggested questions

How can we help to make changes to the local environment?

How long would it take to achieve these improvements?

Can you think of desirable changes to the local environment that would be very difficult to carry out?

Supplementary activities

Pupils could find out how their local council works to improve the local environment. They could access the local council's website to find information about the services offered by the council.

Pupils could focus on one of their proposed improvements and make a digital animation to show how the improvement might be achieved.

Think about each improvement listed below.

Working in pairs, discuss how you would like to see the local environment change so that there are improvements. You might also want to add your own improvements.

improvements	how we would like to see the local environment change
help people lead healthier lives	
make this a 'greener' place to live	
reduce pollution	
protect natural resources or living things	
.....	
.....	
.....	

Levels 3–5

Resources

- ▶ Enquiry Sheet – Signs of Spring
- ▶ newspaper reports of Spring happening earlier each year



Links to skills in the Science PoS

Pupils will need to consider where to find relevant information if they are not already familiar with the issues. They can move on by making their own suggestions for careful observations against dates of incidence. Shared reflections can consider the appropriateness of the criteria selected.

Signs of Spring

Overview

This activity links a contemporary science issue to pupils' awareness of the local environment. Reports in newspapers and on television describe evidence to suggest that Spring is happening earlier each year. This activity requires pupils to think of some of the signs of Spring they might observe locally. Music or poetry could be used as stimulus for this activity.

Activity

Discuss with the pupils some of the reports that suggest Spring is happening earlier than it used to. Explain to them that a science team called 'Spring Watch' asks people to record early signs of Spring that they see in their own area. Ask the pupils to think about the signs of Spring they would observe in their local area.

They could make a list of their ideas on the Enquiry Sheet.

Encourage them to consider all relevant information that they would need to record, such as the features that have been observed, the time of day, date, place, etc.

They could use diamond ranking* to decide which ideas really could show signs of Spring.

Suggested questions

What signs around school help you to see that Spring has arrived?

What information might the scientists need to make good use of your observations?

Supplementary activities

Pupils could use their ideas to carry out a 'Spring Watch' or other seasonal watch e.g. 'Autumn Watch'.

Pupils could record their observations using digital cameras to capture a series of images over time from a fixed vantage point.

Pupils could write a poem about Spring to link with their language work.

Pupils could write a newspaper report that describes some of their own 'Spring watch' findings.

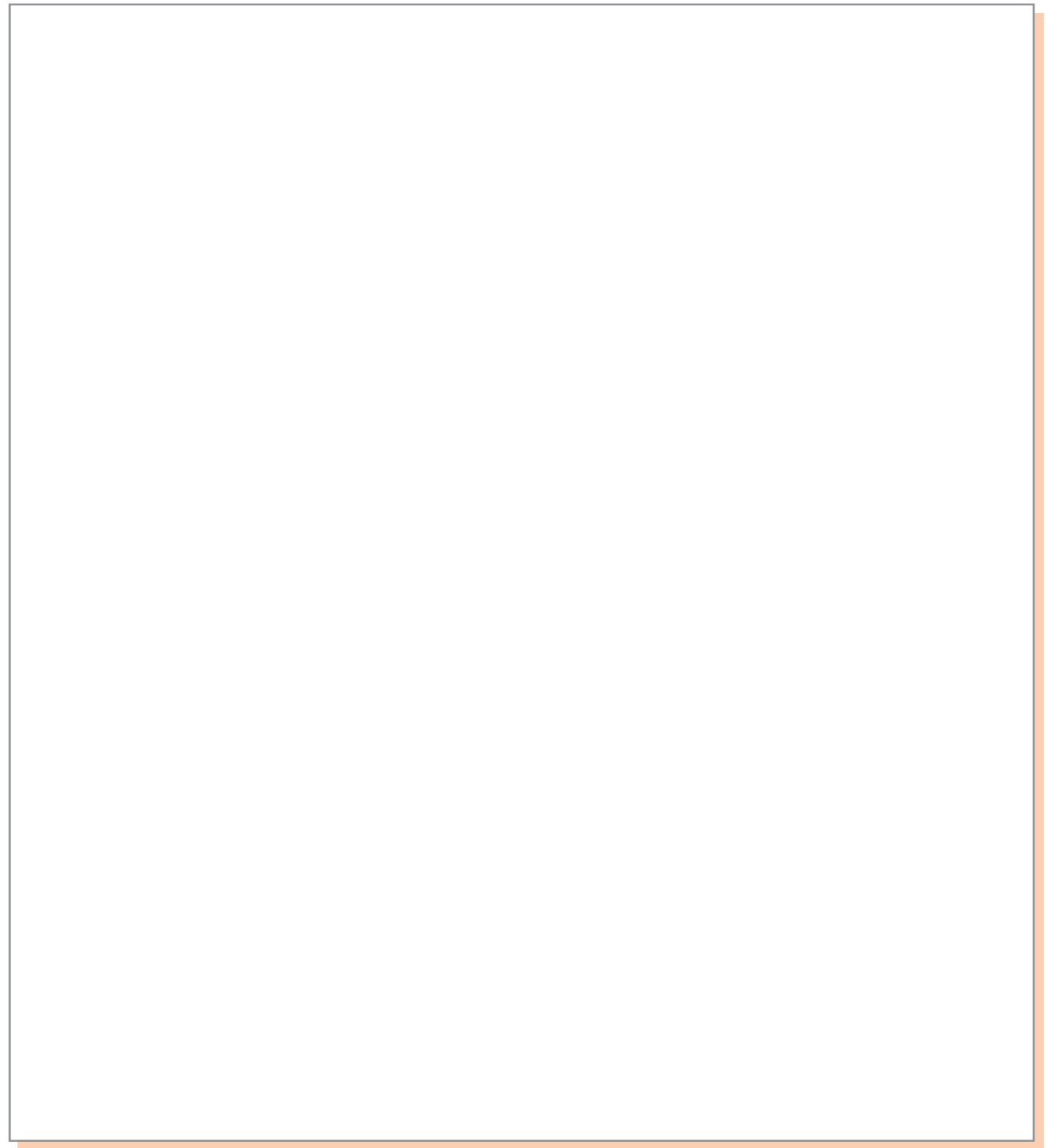
* *Diamond ranking is a strategy that promotes discussion or reflection about the relative importance of a range of factors.*

Scientists say that signs of Spring are appearing earlier each year.

A group of scientists formed 'Spring Watch'. It asks people across the country to look for the first signs of Spring.

Think of some signs of Spring you would look for in the place where you live.

Make a list and some annotated drawings of your group's ideas.

A large, empty rectangular box with a thin black border, intended for students to draw and write their ideas about signs of spring. The box is positioned below the instructions and occupies the central part of the page.

Levels 3–5

Resources

- ▶ Enquiry Sheet – Lichen
- ▶ photo of lichen (available on the CD-ROM of these materials)



Links to skills in the Science PoS

This activity requires careful observation, interpretation of patterns and application of prior knowledge to reach an informed conclusion.

Lichen

Overview

This activity requires pupils to refer to a photograph of lichen growing on a rock and to relate what they observe to influences on the growth of the organism.

Activity

Explain to the pupils that lichen is found as crusty patches or bushy growths on tree trunks, bare ground, rocks, etc. Invite pupils to suggest where they have seen lichen or find places where lichen is growing.

Explain to the pupils that the photograph shows lichen growing on rock near the coast.

Ask the pupils to look at the photograph and to draw and write what they see on the diagram on the Enquiry Sheet.

Then, working in pairs, ask them to think about and discuss why more lichen is growing on one face of the rock rather than on the other faces and to record their ideas.

Suggested questions

Where is most of the lichen growing?

What is different about this part of the rock?

Why do you think more lichen grows here?

Supplementary activities

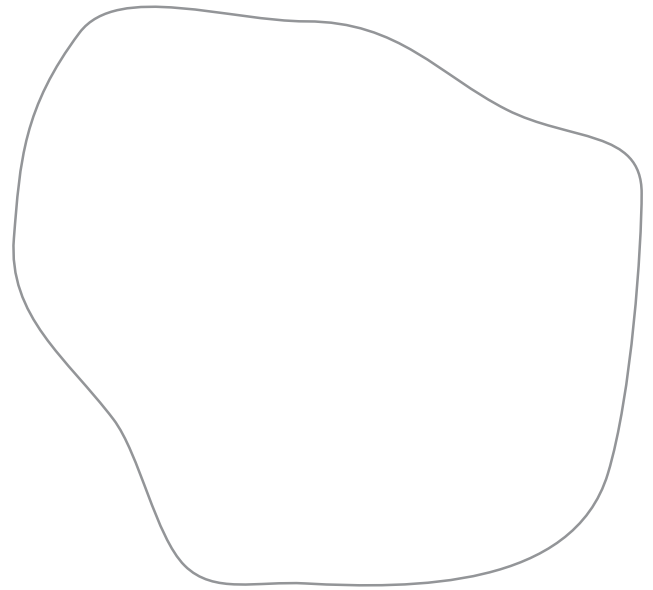
Pupils could find places locally such as church yards where lichen is growing. They could photograph the lichen and then find ways of measuring the area covered by lichen.

Encourage them to think about why lichen grows in some places and not others. They could find out information about what lichen is and where it grows. Some pupils could use lichens as indicators of pollution.

** Lichens have been described as 'dual organisms' because they are symbiotic associations between two (or sometimes more) entirely different types of micro organism – a fungus and a green alga. There are many examples of symbiosis in nature, but lichens are unique because they look and behave quite differently from their component organisms. So, lichens are regarded as organisms in their own right and are given generic and species names. In a garden they can act as an indicator of the absence of pollution (sulphur dioxide) in the air.*

Lichen is an organism that often grows on rocks.

Draw and write on this diagram to show what you saw on the photograph of the rock with lichen growing on it.



There are different kinds of lichen growing on the rock in the photograph. Lichens take many years to grow.

It seems that some kinds of lichens grow more on one face of the rock in the photograph than on the other faces.

Can you think of some ideas to explain why this might be?
Share your ideas with a partner.

Make a list of your ideas:

1.
2.
3.
4.
5.

Levels 3–5**Resources**

- ▶ Enquiry Sheet – Travelling to school
This activity links to unit 7 – Climate Change

Links to skills in the Science PoS

This activity will require pupils to use prior knowledge and evidence from experience to support their point of view. Class debate will encourage reflection on beliefs and perhaps invite consideration of wider possibilities.

Travelling to school**Overview**

This activity encourages pupils to think of arguments 'for' and 'against' travelling to school by car and may be expected to elicit ideas about health, environmental impact, sustainability of energy resources and personal safety – according to the age, concerns and background knowledge of the group.

Activity

In pairs, pupils should think of reasons 'for' and 'against' travelling to school by car. They could use the grid on the Enquiry Sheet to record all of the reasons they could use to argue 'for' and 'against' travelling to school by car. When the grid is completed, they could sort the reasons into two groups, 'for' and 'against' travelling to school by car. They could use the reasons to decide their own personal view.

Pupils could review the reasons 'for' and 'against' travelling to school by car and put them in rank order from the strongest to the weakest reason. They could use 'diamond ranking'* to show the order in which they placed the reasons.

Suggested questions

Which do you think are the most persuasive reasons for and against travelling to school by car?

What helps you to be persuaded by someone's reason?

How could you persuade someone to change their mind?

Supplementary activities

Pupils could identify, collect evidence and discuss other local issues which attract differing points of view.

** Diamond ranking is a strategy that promotes discussion or reflection about the relative importance of a range of factors.*

In pairs: think of reasons **for** and **against** travelling to school by car.

Taking turns, record your reasons in the squares below, putting one reason in each box. See how many squares you can complete.

Sort the reasons into two groups: **for** and **against** travelling to school by car.

Use the reasons to decide your own view of travelling to school by car.

Remember to justify your view.

Levels 3–5

Resources

- ▶ Enquiry Sheet – School playing fields



Links to skills in the Science PoS

The crux of this activity is the production of an argument, with supporting evidence, in support of a claim. Pupils will need to be clear as to whether they are presenting facts, beliefs or opinions as well applying the same criteria in reflecting on other pupils' presentations. The activity lends itself well, but not exclusively, to oral communication.

School playing fields

Overview

This activity uses the context of selling school playing fields to help pupils develop their skills of argument. They could use this context or any other debate about their local environment that could be of interest to pupils. Other relevant contexts might be, 'the closure of swimming pools' or 'building houses on green fields'. The activity uses a 'speed meeting' format to encourage pupils to express their ideas concisely and listen to other people's ideas.

Activity

Ask pupils to read the argument about selling school playing fields on the Enquiry Sheet. Invite them to note down some arguments to support and some arguments against selling school playing fields.

Arrange for the pupils to participate in an activity that uses a 'speed meeting'* format to find out about other pupils' arguments 'for' and arguments 'against' selling school playing fields. Pupils should move from one partner to the next, telling a partner about one argument for or one argument against. Every pupil should record three different arguments for and three different arguments against selling school playing fields on their Enquiry Sheet.

If a pupil is told an argument that they have already recorded, then they move on to another partner in search of a 'new' argument.

Pupils should then rate each argument with a face symbol to show whether they 'agree strongly', 'agree slightly', 'disagree slightly' or 'disagree strongly' with each argument.

Encourage pupils to give reasons for their judgements.

Suggested questions

Which of your arguments do you think is the strongest?

Why do you think this is the strongest argument?

How would you persuade people of your argument?

Can you use the arguments to decide whether you are 'for' or 'against' selling school playing fields?

Supplementary activities

Pupils could collect examples of topics that are creating argument and discussion in the local press. They could review the arguments to identify different points of view and any evidence used to support the beliefs people have expressed.

* *Speed meeting: A discussion format that encourages pupils to express their ideas concisely by giving them only one minute to present their idea to a partner.*

'We can sell the school playing field. A new Sports Centre will be built so pupils can play sports indoors all year round.
We don't need school playing fields.'

With a partner, think of reasons to **support** selling school playing fields and reasons **against** selling school playing fields.

Draw a face to show whether you agree strongly, agree slightly, disagree slightly or disagree strongly with each reason.



agree strongly



agree slightly



disagree slightly



disagree strongly

reasons to support selling school playing fields	which face?
reasons against selling school playing fields	which face?

Levels 4–5

Resources

- ▶ Enquiry Sheet – Wind farms
- ▶ newspapers
- ▶ Internet access



Links to skills in the Science PoS

This activity requires the generation of arguments for and against a proposition. Reasoning will be shaped by considerations of cause and effect using some prior knowledge and additional information gleaned from secondary sources. Discussion with peers will facilitate reflection on the criteria selected to arrive at judgments.

Wind farms

Overview

This activity invites pupils to think about the use of wind farms to produce energy and their impact on the local environment from local as well as national perspectives.



Activity

Discuss with the pupils the construction of wind farms in parts of Wales to provide energy and explain that some people are in favour and others against their construction. Arrange for half the pupils in class to write reasons **for** wind farms and half the pupils to write reasons **against** wind farms. They could use the Internet or newspapers to find evidence and information. Then, use a 'speed meeting'* format for pupils to 'collect' reasons for and reasons against the construction of wind farms to provide energy for people in Wales. Ask the pupils to rate the reasons 'for' and 'against' wind farms and to record what they consider to be the three strongest reasons for and the three strongest reasons against wind farms on the Enquiry Sheet.

Suggested questions

What reasons can you think of against wind farms?
 What reasons can you think of in favour of wind farms?
 Where would you find information that would be useful?

Supplementary activities

Another context that could be used to generate 'for' and 'against' arguments might include the placing of mobile phone masts in villages and school grounds. Pupils could find out about other natural resources in Wales that could be used to provide energy.

* *Speed meeting: A discussion format that encourages pupils to express their ideas concisely by giving them only one minute to present this idea to a partner.*

**strongest reasons
FOR wind farms**

**strongest reasons
AGAINST wind farms**



the construction
of Wind
farms to
provide energy
for people in
Wales.

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