

do
one
thing
spot
some
ladybirds

The text is arranged in a vertical stack. The words 'do', 'one', and 'thing' are in a dark teal color, while 'spot', 'some', and 'ladybirds' are in a bright orange-red color. A dragonfly is positioned above the word 'do'. A large ladybird is on the right side of 'one'. A ladybird is on the left side of 'thing'. A ladybird is on the left side of 'spot'. A sunflower is on the right side of 'spot'. A ladybird is on the right side of 'some'. A ladybird is on the left side of 'ladybirds'.

Welcome to the BBC Breathing Places Schools **Ladybird Survey**. This is the Do One Thing activity for the summer term of 2010.

Why a ladybird survey?

Our six previous activities – planting seeds, creating minibeast habitats, feeding wildlife, creating homes for wildlife, digging ponds and planting trees – have all been selected to improve your school grounds for nature and for the school community. With each activity, pupils have achieved something worthwhile to support or improve the *biodiversity* in school grounds.

Biodiversity, as a word, has only been around since the 1980s and is a shortened form of the phrase 'biological diversity'. What does it really mean? The 1992 Earth Summit in Rio de Janeiro defined biodiversity as:

"The variability among living organisms from all sources, including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems."

What it means in practice to us is the variety of plants and animals that can be found in an area like your school. The wider the variety of plants and animals, in general, the healthier the environment is.

Understanding the level of biodiversity that exists requires research in the field. If we have information, then we are able to establish and implement plans for conservation. We have a long tradition of public involvement in environmental research in the UK where volunteers gather the data upon which scientific judgement is based. The UK Ladybird Survey is a great example of public participation combined with voluntary work by scientists and we have teamed up with them to give your pupils a chance to join this wonderful tradition.

We need your help to monitor all of the different ladybirds that will be found in your school grounds. The following simple steps will allow you to get your pupils outside, observing, gathering data and submitting results. The contribution that your school and ten thousand others can make to understanding these popular minibeasts could be enormous.

Not only will you be Doing One Thing for the science of ladybirds, you will also be making a contribution to the International Year of Biodiversity. There is that word again!

7 spot ladybird, on plant stem, © Helen Roy





How do you perform a ladybird survey?

Ladybirds occur almost everywhere in the UK, comprise a range of easily identified species, are not threatening and can be approached easily by children.

You might have heard of harlequin ladybirds. They are a relatively new species to the UK and have been spreading northwards and westwards from the South East of England. Scientists have been following their progress and trying to assess their impact. For some of you, harlequin ladybirds will be commonly found but for others you may be recording them in your part of the country for the first time.

These factors along with the scientific value of the data gathered make ladybirds ideal for a school survey.

There are two ways of gathering data, outlined in these notes, suitable for children of different ages and abilities. At the simplest level, they can have a **ladybird hunt** in the school grounds or they can perform a more **structured survey**. Both will provide valuable data.

What do you need?

We have provided you with a detailed guide to ladybirds to help you and your pupils to identify what they have seen.

The most useful item that you will need is a 10x hand **magnifying glass**, letting your pupils get a close-up view to make it easier to identify the species. Remember some ladybirds are only 4mm long!

If you are planning a more structured survey, you may need a little equipment such as a **sweep net** and/or a **beating tray**. Do not worry if you do not have these items as they can be easily created from available bits and pieces. To make a sweep net, see the activity sheet available to download from the BBC Breathing Places Schools website. For a beating tray, all you will need is a white or pale-coloured towel or similar piece of cloth or even an upturned umbrella. You will see what we mean in the step-by-step guide.

The UK Ladybird Survey is a primary source of data for scientific research and accuracy of identification is important to ensure the integrity of this data. An easy way to verify the ladybird species that have been found is to take a photo and send it in with the data. A volunteer will confirm the species identification for you. A **digital camera** will make this recording easy. If you cannot take photos, do not worry, all of the data is valuable in assessing the trends and the more records we receive the better. There are some hints and tips for using a pocket digital camera to take pictures and submit them to the survey that you can download from the BBC Breathing Places Schools website: bbc.co.uk/breathingplaces/schools

Let's get started

We need you to think about how your school grounds can be described. The UK Ladybird Survey team have made it pretty easy for us by suggesting a few simple categories:

- Indoors
- Garden (eg flowers and vegetables)
- Park (eg trees, hedges and possibly long grass and weeds)
- Woodland (eg dense trees with leafy undergrowth)
- Moorland (eg low vegetation, such as tussocks of grass, heather and gorse)
- Marshland (eg boggy area with mixed vegetation, grasses and flowering plants, maybe around the edge of a pond)
- Other

If your school grounds cover a number of these categories, you could choose one area or, even better, survey and enter results for more than one area. Your pupils can then compare the results for different habitats.

Decide whether you are going to do a ladybird hunt or a structured survey. Both methods are described here followed by the same method for recording and submitting data.

Where should your pupils look?

Ladybirds are likely to be found where there is food and/or shelter. Most ladybirds eat small bugs and aphids (often called greenflies or black flies), which is why they are considered the gardener's friend. As a result, green leafy plants that attract aphids will also be popular with ladybirds. Nettles, particularly early in the year, will attract ladybirds when they come out of hibernation. You will find out more about the life cycle of ladybirds further on in these notes.

Orange ladybird, clustered on tree, © Toni Watt



14 spot ladybird, in flower, © April Zobel



Ladybird hunt

Step 1

Get your group together and split them into as many teams as is practical. Give each team a copy of the simple identification sheet at the end of these notes. Let them pick one team member to fill in this sheet with what their team find. If it is possible, allow one team member to have a digital camera to record a photo. Give the remaining team members a magnifying glass each.

Note: If you cannot take photos, do not worry, the results are still useful. If you only have one camera for the class or club, ask the hunters to call you or a designated pupil over to take a photograph when they find something.

Step 2

Assign each team to an area of the school grounds and give them 20 minutes or so to hunt in their area, recording any ladybirds that they find. (Make sure that one team hunts in your nature area.) Don't forget to encourage your pupils to turn over leaves, sift through leaf litter and look in crevices in bark or buildings. If they are looking in nettles, warn them to be careful to avoid being stung. They could use a pencil to lift a leaf to see what is underneath.

Step 3

After each team has finished hunting in their area, bring them back together. Now is the time to compare results. Let each team in turn tell the others what they have found.

Step 4

Record and submit the data. (See step 6 of the structured survey on page 5 for the best way to do this.)



Structured survey

At the beginning of the BBC Breathing Places Schools programme we created a simple observation activity, 'Look Around', which is available to download from bbc.co.uk/breathingplaces/schools. This includes a suggested way to map your school grounds. A school grounds map is an ideal way to start this activity, as it will guide you to the best places to survey and will help with the description of land type. The survey area need not be large and will depend on the time available.

Step 1

Look at your school grounds and identify areas that fit the land type descriptions given on page 2. Do not worry if you only have one or two of these land types, for instance a garden area where you may be growing flowers and/or vegetables or a park area with a few trees where sports activities take place. Different ladybirds like different places.

Step 2

Break up your group into as many teams as you can manage and give each team member a role as follows:

- Data recorder (inputting data into a copy of the simple identification sheet on page 10)
- Sweeper, beater
- Beating tray holder(s)
- Inspectors
- Photographer

Allocate each team to a different area of the school grounds.

Allow them 20 minutes to survey their area, identify the ladybirds and record the data.

Step 3

The teams gather data as follows:

Long grass or dense low vegetation

A sweep net can be used for searching meadows, grasses, heathland or other low growing vegetation types. A sweep net is comprised of a white fabric bag held open by a stout ring attached to a handle. The sweep net is best used by walking slowly and sweeping from side to side. Considerable coverage of an area can be made quite quickly using this method.

When you have swept the area, carefully empty the contents onto a large sheet of white paper. Make sure that all of the minibeasts have been released from the net. The contents can then be examined.

Shrubs and trees

A beating tray is used where ladybirds are in amongst trees and shrubs. You could stretch a piece of light-coloured cloth between two pupils underneath a tree or shrub which is then beaten or vigorously shaken, taking care not to damage the plant. Insects that have taken refuge there will fall into the tray for collection. An upside down umbrella also works well to catch falling minibeasts.

Other areas

No special equipment is required, just observe and record what is found as described in Step 2 of the ladybird hunt.





A whole world of surveys

Step 4

Using magnifying glasses, identify which types of ladybirds you have collected, record the species and number found on the identification sheet and take a photo of each type found if you have a camera available.

Note: After identifying your catch, make sure that all of the minibeasts that have been collected are released back where they were found.

Step 5

When all of the teams have completed their survey, ask them to return to the group where they can share and compare results.

Step 6

Recording and submitting your data

There are two principal methods depending on school facilities.

Both can be achieved directly online and the first uses a simple web application designed to work with an electronic whiteboard as well. When your pupils have gathered the data, this application provides an easy way for all of them to participate in the submission of the data.

The other method is to use the standard online UK Ladybird Survey entry form that will allow all of the data to be easily entered.

You can find both entry methods at bbc.co.uk/breathingplaces/schools

Results

Results of the survey that your school has taken part in will be published on the Breathing Places website before summer.

We are sure that you and your pupils will enjoy our ladybird survey. After you have dipped your toe in the water, we expect that you will be keen to try other surveys. We have put together details of a selection of surveys that we think are suitable – they can be found on the Breathing Places website:

bbc.co.uk/breathingplaces/schools

Hints and tips

Identifying ladybirds

Keep handy the fold-out guide that we have supplied in case your pupils are not sure what they have found and to help identify some of the less common species. There are 46 ladybird species in the UK – we have listed ten common and easily recognised ones in the ID and recording sheet and there are another 16 species in the fold-out guide. The information in the guide should allow you to answer any identification questions and explain the life cycle of ladybirds in some detail.

If you find something that cannot be recognised but are sure is a ladybird, the team at the Centre for Ecology and Hydrology will be happy to look at a photo and tell you what species it is. Just send your picture by email to ladybird-survey@ceh.ac.uk and put Breathing Places Schools Ladybird ID Request in the message title.

Look out for larvae and pupae as well as adult ladybirds during the survey as these should be included in the count. The UK Ladybird Survey website provides some useful downloads including a larvae identification sheet at www.ladybird-survey.org/ladybirds.aspx

For some images of pupae, take a look at the 'Ladybirds' natural enemies' activity sheet referenced in the next section.

Handling and examining ladybirds

You should not need to handle ladybirds but if you do want to pick one up for a closer look, encourage it to walk onto a piece of paper or a soft paint brush. Remember to put the ladybird back where it was found.

If you do want to bring one into class, you can keep it in a small closed container such as a clear jar. There will be plenty of air for the ladybird to breathe but you should release it on the same day in the location where it was found so that it can find food.

Ladybirds can give out a yellow liquid if threatened. This is called reflex blood and has a strong smell and contains the toxins that make ladybirds unpleasant for most predators.

Ladybirds can, but rarely do, bite. Apart from feeling a sharp nip, this will not do you any harm.

More things to do

All activity sheets can be downloaded from bbc.co.uk/breathingplaces/schools unless otherwise stated.

Ladybirds' natural enemies

We have included an interesting activity that will allow your pupils to perform a simple experiment investigating who preys on ladybirds. Download the activity sheet to get started.

Make a sweep net

If you have long grass or other dense low vegetation in your survey area, the ideal way to gather ladybirds (and other insects) is with a sweep net. You can make a sweep net from readily available household items as shown on a downloadable activity sheet from bbc.co.uk/breathingplaces/schools

Art projects

Ladybirds are colourful with interesting patterns on their wing covers making them good subjects for drawing, painting and model making. Why not have your pupils draw pictures showing the variety of ladybirds that they have seen?

Another suggestion would be to draw a map of the school with illustrations of the ladybirds found in each area. If you have photos, why not use them on your map?

For the autumn term of 2009 we included an activity sheet on how to make nut bugs. You could use the same ideas, perhaps recycling everyday items to make models of ladybirds. Download nut bugs activity sheet at bbc.co.uk/breathingplaces/schools/autumn09

Ladybird dominoes

We have included an activity sheet that will allow your pupils to make an interesting set of ladybird dominoes. They are fun and informative, letting your pupils learn to identify different ladybirds as they play.

Make a ladybird winter roost

Most ladybirds hibernate during the winter. You can help them by providing a safe, cosy place for them in the school grounds. We showed you how to make a bee home in the summer 2008 teacher's notes using things that would otherwise be thrown away. This will also provide an excellent place for ladybirds to spend the winter. You can download these teacher's notes at bbc.co.uk/breathingplaces/schools



What can we learn from the spread of harlequin ladybirds?

Storytelling

Your pupils can write poems or stories about ladybirds. Inspiration can be found in some of the folklore associated with ladybirds. For instance, many children will know the nursery rhyme:

*Ladybird, ladybird fly away home,
Your house is on fire
And your children all gone;
All except one
And that's little Nan,
And she has crept under
The warming pan.*

One of the possible sources of this rhyme comes from Medieval England, where farmers would set torches to the old hop vines after the harvest, to clear the fields for the next planting. The poem was a warning to the aphid-eating ladybirds, still crawling on the vines in search of aphids. The ladybird's children (larvae) could get away from the flames, but the immobile pupae (Nan) remained fastened to the plants (laces) and couldn't escape.

A legend persists on how ladybirds got their name, dating from the Middle Ages when swarms of insects were destroying the crops. The farmers prayed to the Virgin Mary for help. Soon thereafter the ladybirds came, devouring the plant-destroying pests and saving the crops! The farmers called these beautiful insects 'The Beetles of Our Lady', and – over time – they eventually became popularly known as 'Lady Beetles'. The red wings were said to represent the Virgin's cloak and the black spots were symbolic of both her joys and her sorrows.

The survival of the diversity of the natural world faces many challenges: loss of habitat, climate change, over-exploitation of resources and development pressures are well-known issues. However, the issue of invasive non-native species is probably the one that arouses more distrust in the whole of nature conservation than any other. Why should this be? Think of cats and rats on seabird nesting islands, knotweed clogging waterways, predatory *Varroa* mites infesting honeybee colonies, and grey squirrels that pass disease to red squirrels.

Much is down to the shorthand language that is used to describe the family of problems this includes, and in particular, the unwitting sharing of terms with far-right wing politics and an incorrect linkage to the human race and immigration issues. Terms like 'alien', 'foreign', 'non-native' and 'swamped by invaders' all crop up in well-meaning discussions about how to help wildlife cope with new threats to its survival. This family of problems, that most nature conservationists currently refer to as the invasive non-native species issue, is huge, and largely caused by the human habit of moving species about, either deliberately or by accident.

Harlequin ladybird, on small flowers, © Mark Bond



When these issues are reported in the media, it often comes across in inflammatory language that discourages whole sectors of society from becoming interested in conserving the natural world. In short, the way this issue is described can be a barrier to engagement not only with this concept, but also with nature conservation as a whole.

We encourage you to explore this issue with your pupils allowing them to make their own judgements about invasive non-native species, and to discuss it in ways that defuse the rhetoric. Harlequin ladybirds (that many schools will find) are a good example of a non-native species whose impact on other species is not yet fully known. Partly this is because we haven't been looking, but also because it takes time for natural systems to adapt. When they first arrived in 2004, for example, they had no known predators, but they have recently begun to be parasitised by some of the species that have always attacked our ladybirds. Whether this controls the spread of the harlequins or not remains to be seen.

Harlequin ladybirds, in a cluster on a wall, © Cathy Clarke



Here are some points to remember when talking about the impact of non-native species:

- Over 90% of non-native species cause no visible effects on their new neighbours; they are simply exotic additions to our landscape.
- Each newly introduced species is likely to react in its own way; generalisations are dangerous.
- You can't blame non-native plants for their biology. They do what they have to for survival.
- It is illegal to release non-native species intentionally into the wild in the UK.
- Prevention is better than cure; it is always easier and cheaper to keep a species out than to remove a successful invader.

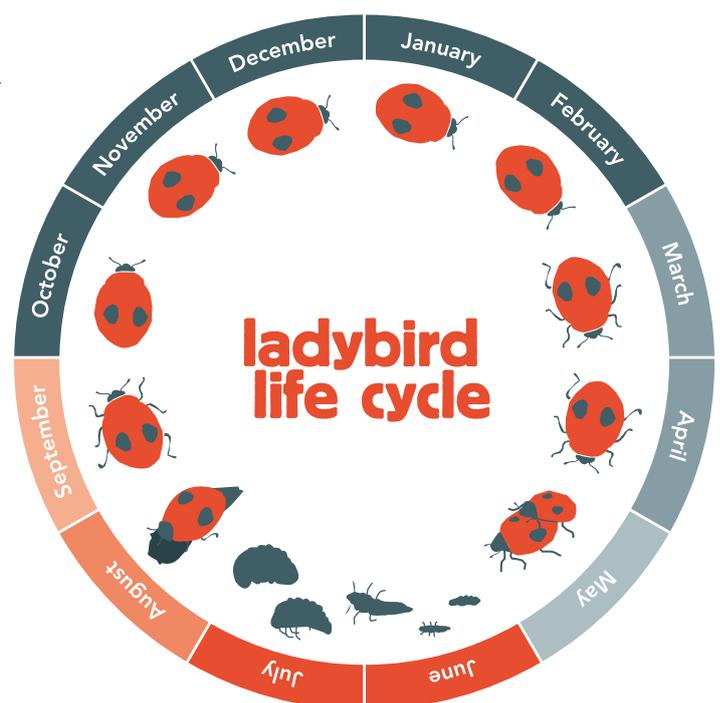
Problems that may occur:

- Non-natives may compete with our own wildlife for space, food, nest sites or nutrients – all cases are different.
- Non-natives may increase the susceptibility of native species to disease (eg grey squirrel, Varroa mite).
- Some non-natives may eat our wildlife (eg mink).
- Some non-natives may cause huge environmental or economic damage.



Interesting facts

- Ladybirds are small beetles with round bodies that look like half a pea.
- They can be all sorts of colours, often bright red or yellow with black, red, white, or yellow spots. The bright colours warn predators that ladybirds taste unpleasant.
- There are 46 species in the UK but in the world as a whole there are over 5,000 different kinds.
- Ladybirds are quite communal insects. Whilst hibernating in winter, they will often crowd together under a piece of loose bark or in crevices.
- The growth pattern of ladybirds is very similar to moths and butterflies – they pass through three stages of growth (egg, larva and pupa) before becoming an adult.
- Ladybirds lay lots of eggs. For instance a female 2-spot ladybird can lay over 1,000 eggs in groups of between 20 and 50.
- The larvae are generally blue or dark grey, with orange or yellow markings and are generally about in June and July.
- Once the larvae have emerged, they will feed on aphids constantly for approximately three to four weeks, then moult to become pupae.
- The pupa is attached to a leaf by its tail and, after about two weeks, an adult ladybird will emerge.
- Most UK ladybirds only live for a year.
- The seven-spot ladybird is a migratory species. In spring, large numbers fly in search of aphid-infested plants where they will feed, mate and lay their eggs.
- Most ladybirds are carnivorous. Greenfly and black fly (aphids) are favourite foods. Ladybirds are very popular with gardeners because aphids cause a lot of damage.
- Some ladybirds are vegetarian. The 24-spot ladybird eats plants, and the orange ladybird feeds on mildew.
- Ladybirds will drink if they come across a dew drop or some honeydew (sugary stuff that the greenfly produce) but can manage quite well without water.
- Harlequin ladybirds come from Asia and were brought to Britain as a way of keeping garden pests in check. They do this very well, having a big appetite for black and greenfly, but they also eat other things such as other ladybird eggs, larvae and pupae. Scientists are worried that this visitor will have a big impact on our native ladybirds.



Ladybird identification and recording sheet

Date:	Start time:			Finish time:		Name:	
Habitat: (circle one)	Indoors	Garden	Park	Woodland	Moorland	Marshland	Other (describe)
Species	Scientific name	What it looks like	Size	Tally	Total number	Photo?	
2-spot	<i>Adalia 2-punctata</i>		4 – 5 mm ○ ○				
10-spot	<i>Adalia 10-punctata</i>		3.5 – 4.5 mm ○ ○				
Cream-spot	<i>Calvia 14-guttata</i>		4 – 5 mm ○ ○				
7-spot	<i>Coccinella 7-punctata</i>		5 – 8 mm ○ ○				
Pine	<i>Exochomus 4-pustulatus</i>		3 – 4.5 mm ○ ○				
Orange	<i>Halyzia 16-guttata</i>		4.5 – 6 mm ○ ○				
Harlequin	<i>Harmonia axyridis</i>		6 – 8 mm ○ ○				
14-spot	<i>Propylea 14-punctata</i>		3.5 – 4.5 mm ○ ○				
24-spot	<i>Subcoccinella 24-punctata</i>		3 – 4 mm ○ ○				
22-spot	<i>Thea 22-punctata</i>		3 – 4 mm ○ ○				

Other (describe look and size)

Illustrations courtesy RSPB, © Chris Shields and Andy Hamilton

Question Time

Here are some stimulating questions on the theme of ladybirds and surveys. Encourage your pupils to look for answers in books and on the internet, if they want to discover more.

- Why are ladybirds known as the gardener’s friend?
- Where is the natural home of the harlequin ladybird?
- When was the harlequin ladybird first seen in the UK?
- Do you know a nursery rhyme about ladybirds?
- What do ladybirds eat?
- Where do ladybirds go in the winter?
- How long does a ladybird live?
- Why do we do surveys?
- Does your local authority have a biodiversity action plan? If so what plants or animals are priorities in your area?
- Which landscapes have the most biodiversity and which have the least? (Think on a grand scale, rainforests, coral reefs, grasslands, cities etc)
- Can you find out about any species of plant or animal in the UK that could disappear, that is, become extinct? (A useful link is www.biodiversityislife.net)

