



*Natural Nations:* Biodiversity in  
Schoolgrounds for Learning and Wellbeing

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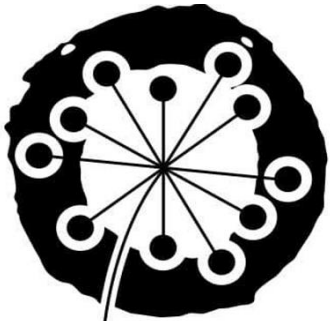
ANNA PERSSON, CEC, LUND UNIVERSITY & LINA HÄLLSTRÖM, NATURSKOLAN I LUND, SWEDEN







NATURAL NATIONS



Learning  
through  
Landscapes



Erasmus+



LUND  
UNIVERSITY



Naturskolan i Lund



LUNDS  
KOMMUN





## Topics we will cover

- Biodiversity: What is it and why should we care?
- Biodiversity in built environments
- Citizen science
- What is **Natural Nations** and how can you participate?





# What is biodiversity?

- The number of species in an area?



*Photos: Pixabay*



# What is biodiversity?

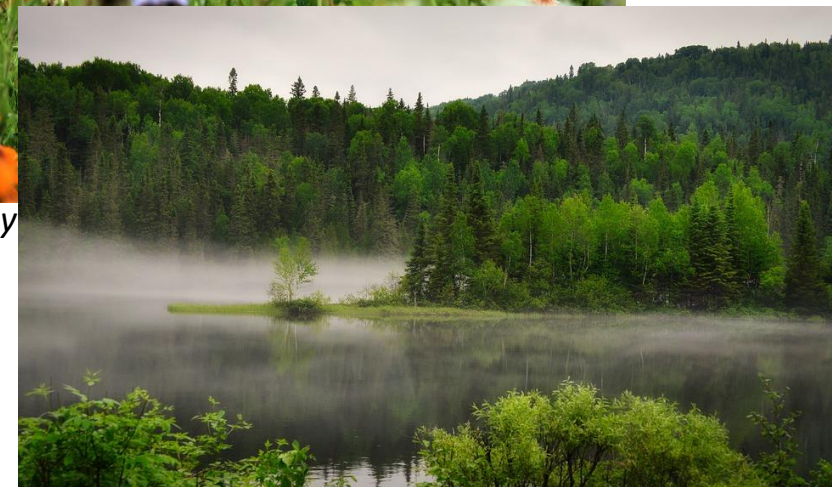
- The Convention on Biodiversity (CBD), UN Rio Summit 1992

## Biological variation:

- within species (genetic diversity)
- between species (species richness)
- between ecosystems (types of nature)



Photos: Pixabay

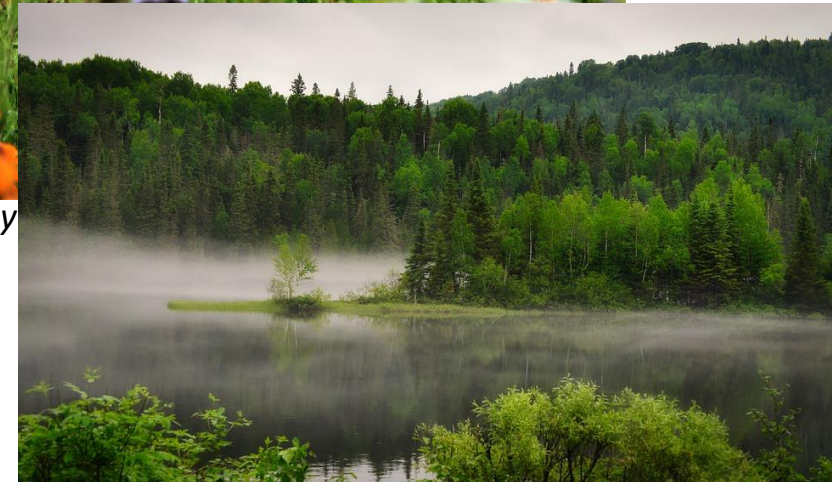




# What is biodiversity?

The **forms** and **functions** of life:

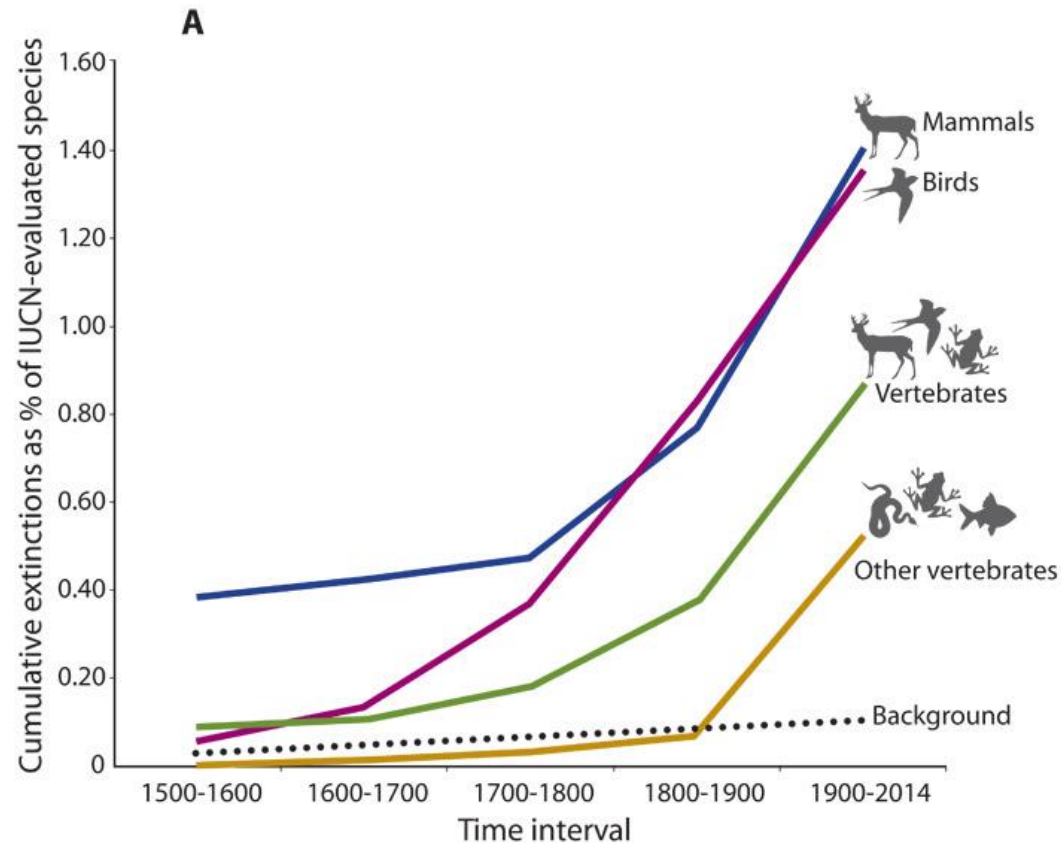
Result of millions of years of **evolution** and **adaptation** of all organisms to their environment



*Photos: Pixabay*



# How is biodiversity doing?



## A sixth mass-extinction

(or [Holocene extinction - Wikipedia](#))  
- Compared to background levels in fossil records

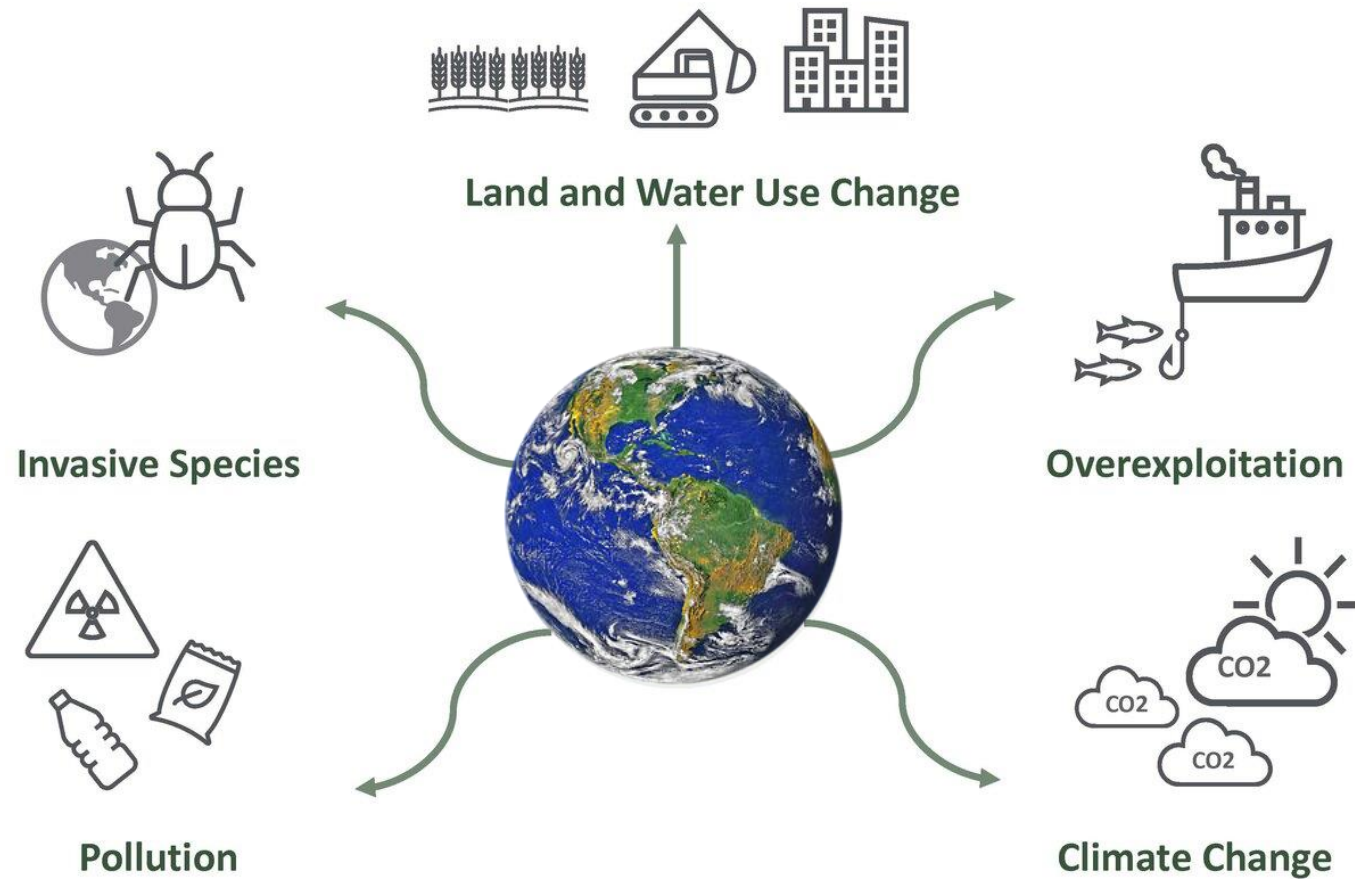
**Fig. 1 Cumulative vertebrate species recorded as extinct or extinct in the wild by the IUCN (2012).**

Graphs show the percentage of the number of species evaluated among mammals (5513; 100% of those described), birds (10,425; 100%), reptiles (4414; 44%), amphibians (6414; 88%), fishes (12,457; 38%), and all vertebrates combined (39,223; 59%). Dashed black curve represents the number of extinctions expected under a constant standard background rate of 2 E/MSY. (A) Highly conservative estimate.

(B) Conservative estimate. *Source: Ceballos et al. (2015) Sci.Adv. DOI:10.1126/sciadv.1400253*



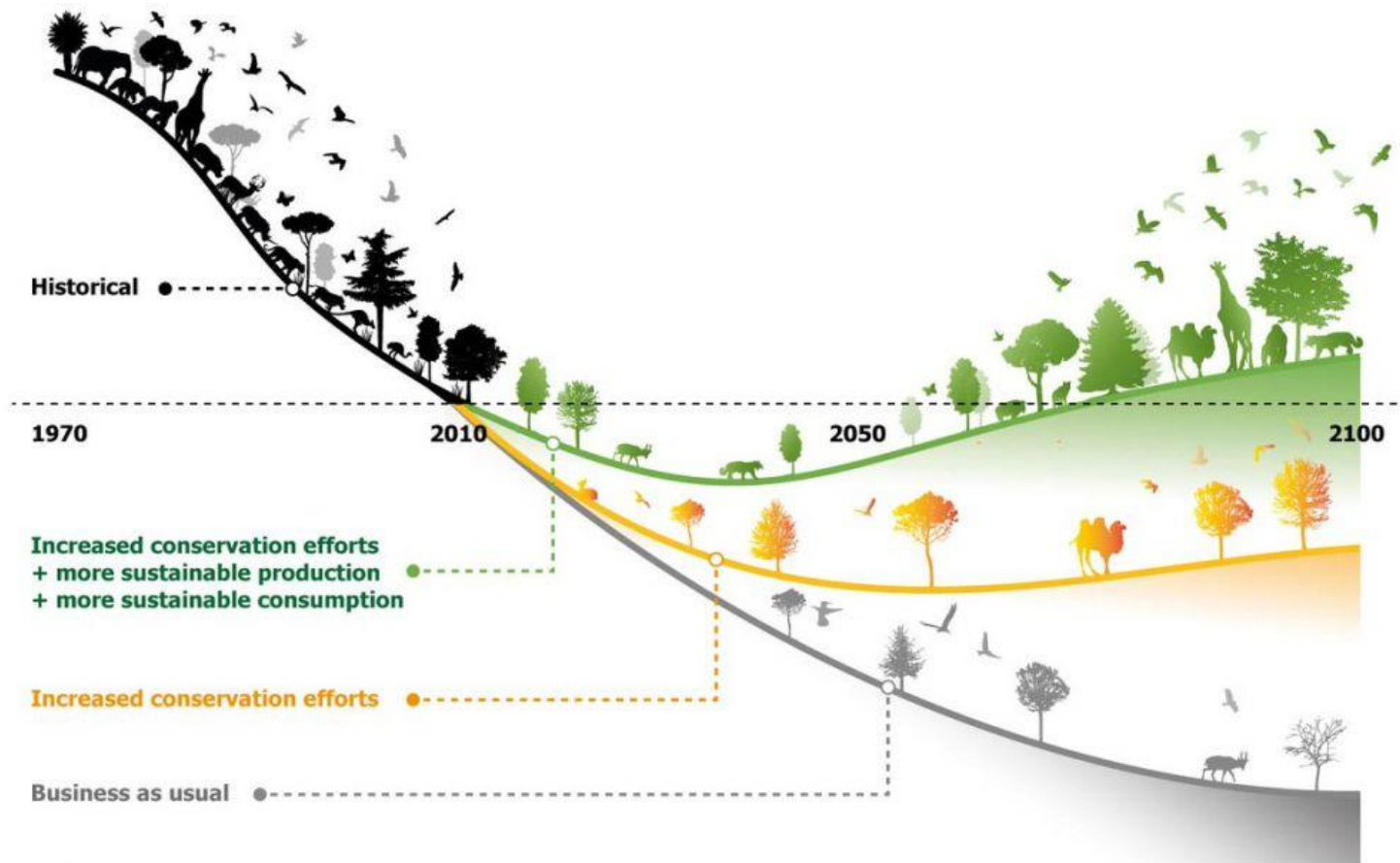
# The five main threats to biodiversity



Design: Abby Litchfield



# How is biodiversity doing?



**UN COP 15 (Montreal, 2023):**

- Both protect & restore habitats
- New target "30 by 30"

This artwork illustrates the main findings of the article, but does not intend to accurately represent its results (<https://doi.org/10.1038/s41586-020-2705-y>)

Source: Leclère, et al. (2020) *Nature*. <https://nature.com/articles/s41586-020-2705-y>



# Why preserve biodiversity?

Ethical reason – acknowledging the **intrinsic value** of organisms



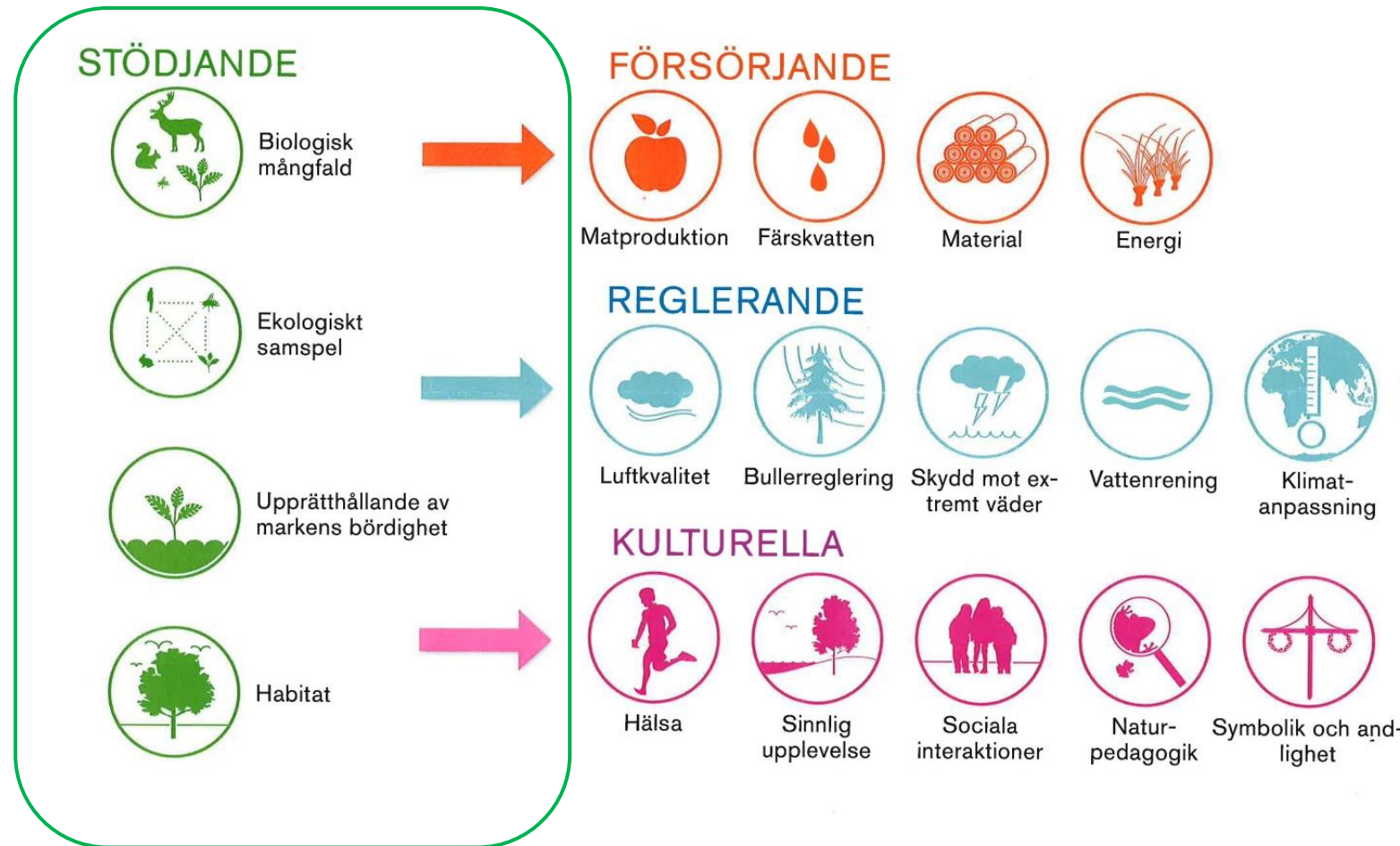
*Photos: Pixabay*



# Why preserve biodiversity?

## Instrumental (use) values

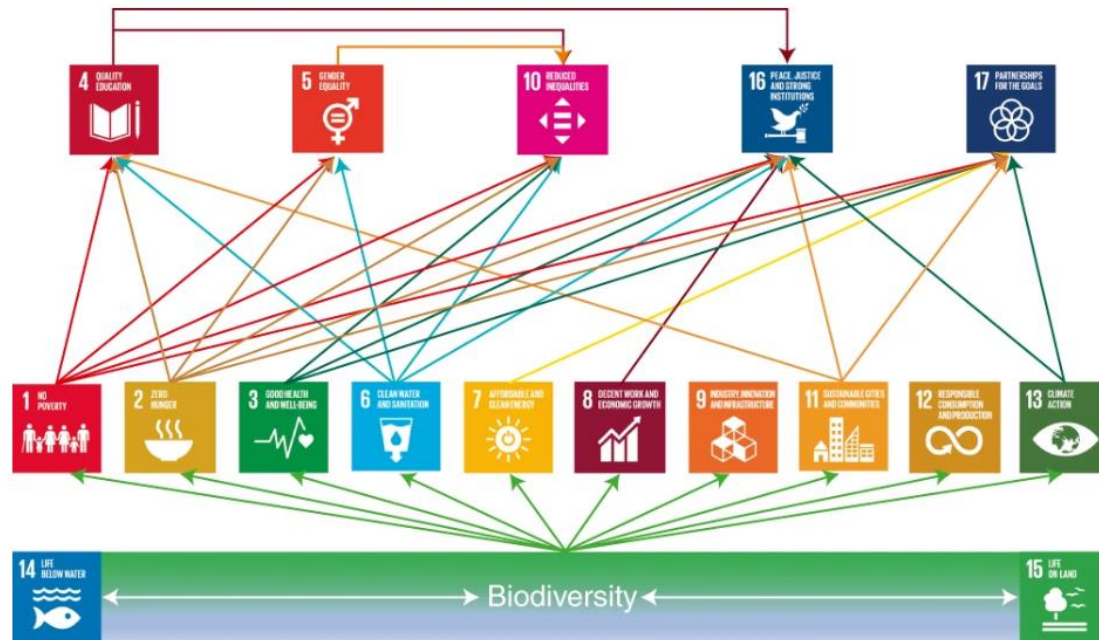
- Ecosystem services
- Climate adaptation
- Insurance hypothesis – more species means higher chance of healthy ecosystems in the future



# Why preserve biodiversity?

Fig. 2: A summary illustration of our examples of the ways that biodiversity contributes to the SDGs.

From: Biodiversity's contributions to sustainable development



United Nations (UN/SDG).

Our study demonstrates that biodiversity is not only relevant to SDGs 14 and 15 (lower tier of the figure), but may also directly support fulfilment of ten of the other SDGs (middle tier) and thereby contribute indirectly to achieving the remaining five SDGs (upper tier). We sought to exemplify direct contributions of biodiversity to every SDG. For those SDGs where we were unable to find examples of direct contributions, we sought to exemplify that they are indirectly

Biodiversity directly supports 10 of the SDGs and indirectly the remaining 5.

Source: Blicharska, *et al.* (2019)  
*Nature Sustainability* 2, 1083–1093.



# We need nature for wellbeing

## Doctors in Scotland can now prescribe nature to their patients

Take one long stroll, four times a week.

EVAN FLEISCHER 12 October, 2018



- Doctors in Shetland, Scotland can now give nature prescriptions to their patients.
- It's believed to be the first program of its kind in the U.K., and it comes with a year-long calendar of outdoor recommendations.

nature > scientific reports > articles > article

## SCIENTIFIC REPORTS

Article | OPEN ACCESS | Published: 13 June 2019

### Spending at least 120 minutes a week in nature is associated with good health and wellbeing

Mathew P. White [✉](#), Ian Alcock, Angie Bone, Michael H. Depledge

Scientific Reports 9, Article

"Vitamin N"




Home / News & Opinion

## Smells of Nature Lower Physiological Stress


In a virtual reality experiment, participants recovered faster from a small electric shock when they could smell natural scents than when they could smell urban odors.

# We need nature for a good microbiota




Environment International

Volume 157, December 2021, 106811




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## Long-term biodiversity intervention shapes health-associated commensal microbiota among urban day-care children

Marja I. Roslund <sup>a</sup>, Riikka Puhakka <sup>a</sup>, Noora Nurminen <sup>b</sup>, Sami Oikarinen <sup>b</sup>, [Nathan Siter](#) <sup>c</sup>, Mira Grönroos <sup>a</sup>, Ondřej Cinek <sup>d</sup>, Lenka Kramná <sup>d</sup>, Ari Jumpponen <sup>e</sup>, Olli H. Laitinen <sup>b</sup>, Juho Rajaniemi <sup>e</sup>, Heikki Hyöty <sup>b</sup>, Aki Sinkkonen <sup>f,g,h</sup>  the ADELE research group<sup>1</sup>

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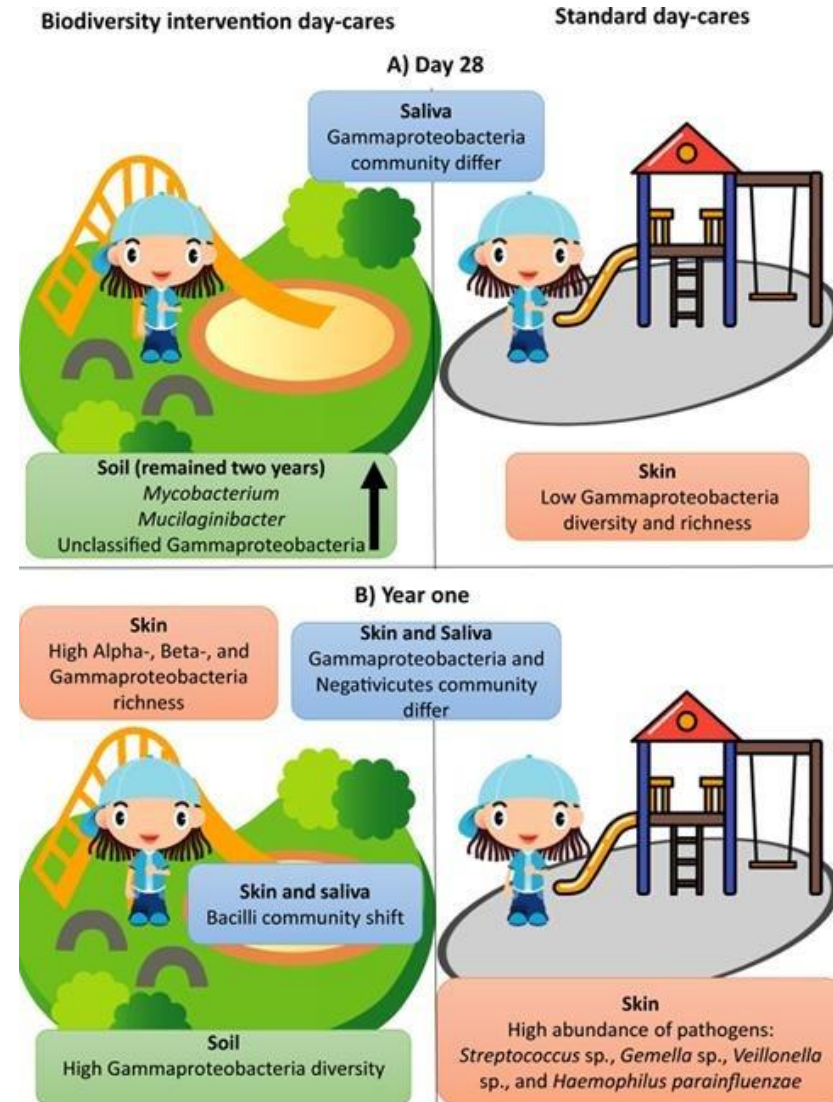
<https://doi.org/10.1016/j.envint.2021.106811>
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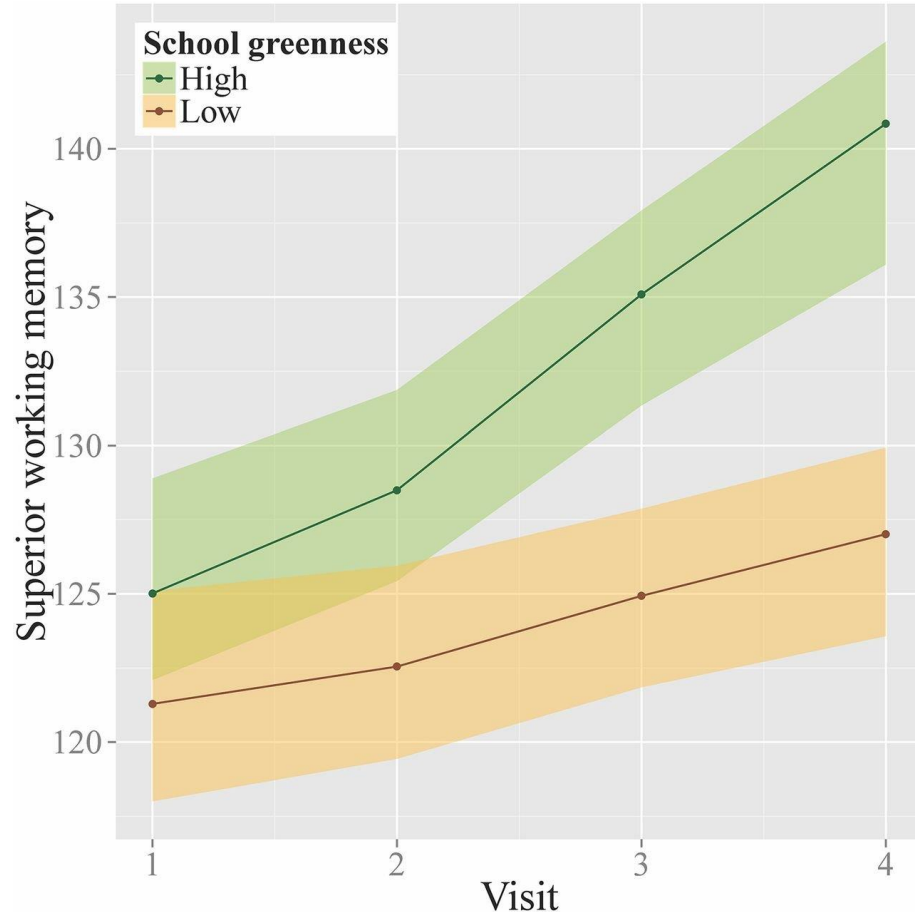
### Highlights

- Biodiversity intervention causes long-term shifts in commensal microbiota among urban children.
- Exposure to biodiversity suppresses potentially pathogenic bacteria on the skin.
- Microbial changes on skin are associated with changes in the gastrointestinal tract.
- Findings are in line with the “old friends” and “biodiversity” hypotheses of immune-mediated diseases.





# We need nature for cognitive development



- School children (7-10 yrs) developed better **memory and cognition** when school grounds had more vegetation
- Both **vegetation *per se*** and better **air quality** had positive effects

(2593 children in Barcelona, 1 year study)

# We need nature for pedagogics

How we perceive nature and its status depends on our lived experiences



- *”Ecological literacy”*
  - *”Extinction of experience”*
  - *”Shifting base-line syndrome”*
  - *”Plant blindness”*
- How can we care for something we do not know?



# What does biodiversity need?



The right resources, of enough quantity, within reach!

Photos: Pixabay

# Biodiversity in built environments

Loss of habitats → Small and fragmented habitats

Designed green spaces → Changed content, lower quality



Photo: Mjölby kommun



# Improving built environments

Insect pollinators:

- Benefit from a high diversity of (native) flowering plants locally
- The quality and management of green spaces makes a difference

→ **Make it flower!**

Sources:

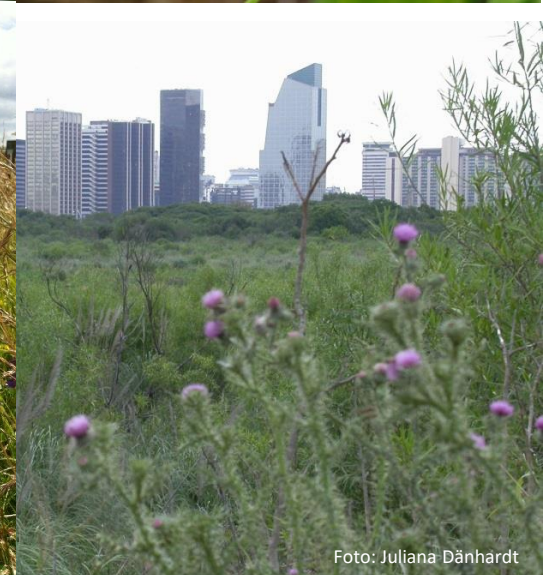
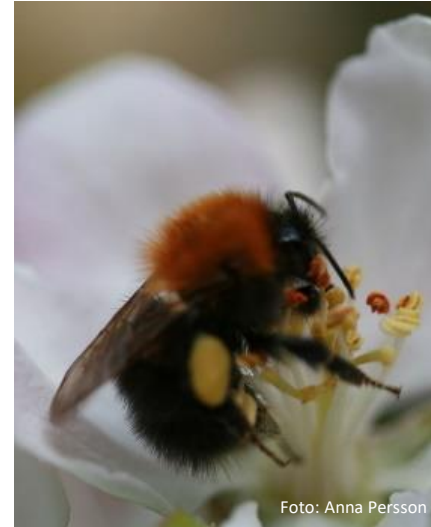
Baldock et al. (2019) *Nature Ecol and Evol*

Hall et al. (2016) *Cons Biol*

Winfrey et al. (2009) *Ecology*

Banaszak-Cibicka & Zmihorski (2012) *J Insect Cons*

Aguillera et al. (2018) *Urb Ecosyst*,



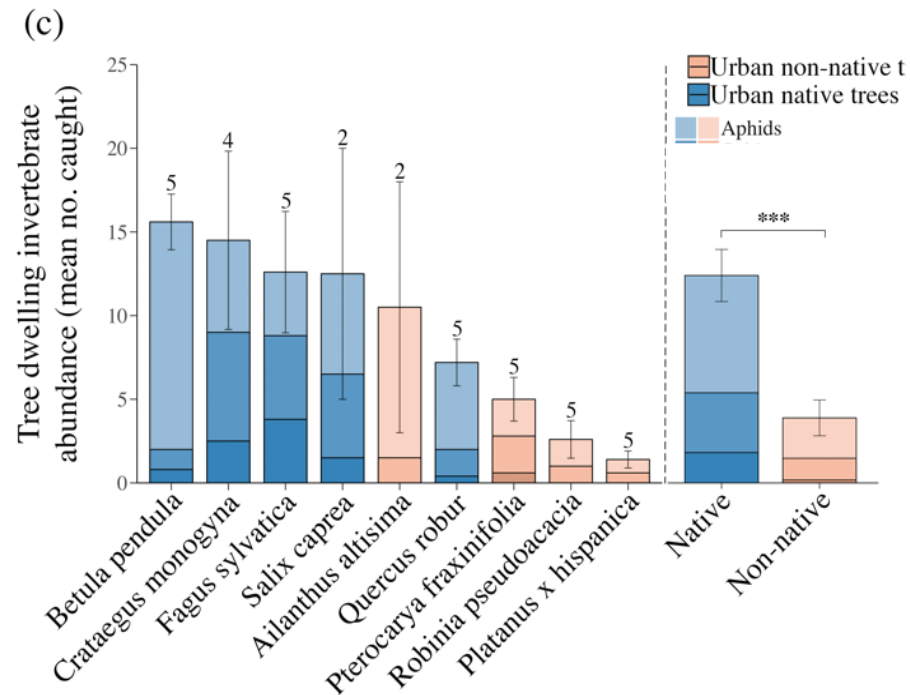
# Improving built environments

More insects and spiders in native trees

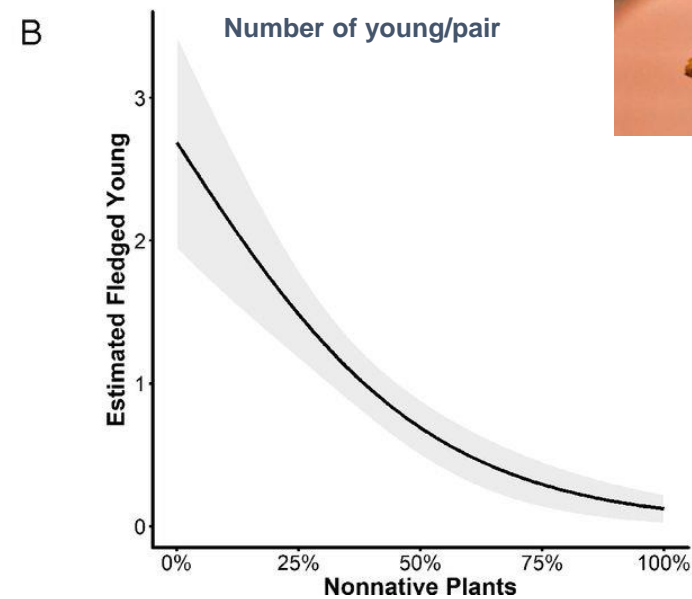
→ Nesting birds have more young with more food in trees



Foto: Pixabay



Source: Jensen et al. (2022) Ecological Applications



Source: Narango et al. (2018) PNAS



# Citizen science

- Data collection by the public
- Education and dissemination
- Different levels of engagement
- From spontaneous observations to standardised protocols

→ **Natural Nations** use 4 protocols, but every school or class does not have to do them all... *more on this later*

*Read more on, e.g.: Citizen science - Wikipedia*

The image displays three overlapping screenshots. The top screenshot is the eBird website, featuring the Cornell Lab of Ornithology logo, navigation links (Submit, Explore, My eBird, Science, About, News, Help), and a main banner with the text "Discover a new world of birding..." and buttons for "Learn more" and "Get started". The middle screenshot is the Bumble Bee Watch website, showing a navigation bar with links like Home, About, Record a Sighting, Bumble Bee Species, Map, Gallery, Explore Data, and Resources. The main content area includes a heading "Welcome to Bumble Bee Watch!" and a photograph of a yellow-faced bumble bee on a sunflower. The bottom screenshot is the Natural Nations logo, which consists of four circular icons: a purple circle with a white butterfly, a green circle with a white flower, an orange circle with a white bumble bee, and a blue circle with a white bird. Below the icons, the text "NATURAL NATIONS" is written in a bold, sans-serif font.

# Natural Nations aims to

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- To awaken interest and curiosity for animals and plants found in your school grounds.
- To create an understanding of what needs to change in your school grounds for more animals and plants to thrive there.
- Add on: Collect data on school ground biodiversity for research



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# Project outcomes

## Educational resources

- About 50 lesson ideas covering birds, habitats and vegetation, pollinators, minibeasts and leaves.
- A series of cultural heritage resources about some of the wildlife you might see in your school grounds.

## Surveys & guidance

- Surveys
  - School Grounds and Habitat
  - Birds
  - Pollinators and Flowering Plants
  - Minibeasts and Leaves
- Practitioner guidance for Surveys
- Pollinator Identification Guide
- Short animated instruction videos
- Data Entry Website







# S1 School Grounds and Habitat Survey



## About you

Name of your school

What country are you participating from?

## Aims

- To become familiar with the survey
- To understand how to use the survey
- To begin differential
- To learn about different habitats

## What you will need

### Essential

- 'Practitioner Guidance' document
- Pen, pencil and eraser
- Clipboard/suitable sheet of paper

## Funders and partner organisations



# S1 School Grounds and Habitat Survey



# S2 Bird Survey



## About you

Name of your school

What country are you participating from?

## Aims

- To become familiar with the survey
- To understand how to use the survey
- To begin differential
- To learn about different habitats

## What you will need

### Essential

- 'Practitioner Guidance' document
- Pen, pencil and eraser
- Clipboard/suitable sheet of paper

## Funders and partner organisations



## About you

Name of your school

What country are you participating from?

## Aims

- Explore the use of the survey
- To become familiar with the survey
- To develop skills

## What you will need

### Essential

- 'Practitioner Guidance' document
- Pen, pencil and eraser

## Funders and partner organisations



## S2 Bird Survey



# S3 Pollinators and Flowering Plants Survey



The longest running

## About you

Name of your school

What country are you participating from?

## Aims

- To become familiar with the survey
- To transfer real world skills to the survey
- To become familiar with the survey
- To estimate flower cover

## What you will need

### Essential

- 'Practitioner Guidance' document
- Identification Guide
- Pen, pencil and eraser
- Metre long stick(s) and/or 5-metre rope
- Timer

## Funders and partner organisations



# S4 Minibeasts and Leaves Survey



## About you

Name of your school

How many participants are in your survey group?

What country are you participating from?

What is the average age of the participants?

## Aims

- To familiarise students with taking a subsample within their sampling area
- To assess proportional coverage of habitats with a focus on living vegetation cover
- To observe, group and identify a range of minibeasts in their natural habitat

## What you will need

### Essential

- This sheet and 'Practitioner Guidance' document
- Pen, Pencil and Eraser + Clipboards
- 1-metre-long stick(s) and/or 5-metre rope
- Timer

### Helpful

- Gloves
- Camera
- Sampling pots and pre-made 1x1m square
- Identification aids (see guidance)

## Funders and partner organisations



# Practitioner Guidance for Surveys



## Introduction

Welcome to the Natural Nations survey project and thank you for participating.

This resource is for Natural Nations

Firstly, it focuses on closely to extended classes and Not all schools have classes and

Remember to learn.

Table of contents

General information

School ground survey

Bird survey

Pollinators and flowering plants

Minibeast survey



# Pollinator Identification Guide



## About the Pollinator Identification Guide

Welcome to the Pollinator ID Guide, to be used with the Pollinator and Flowering Plants survey. ID Guides help us identify species by giving us information on size, shape, colour and anatomy. Look closely at an insect (you may want to use a magnifying glass or hand lens), and compare it to groups listed below; can you identify it? If not, take a picture of the insect and use the internet to identify it later!

## Butterflies and Moths

Butterflies	Moths
Lepidoptera	Lepidoptera
<ul style="list-style-type: none"> <li>Clubbed antennae</li> <li>Butterflies rest with their wings closed vertically over their body</li> <li>Various sizes</li> </ul>	<ul style="list-style-type: none"> <li>Most species have feathered antennae</li> <li>Most moths rest with their wings open</li> <li>Various sizes</li> </ul>

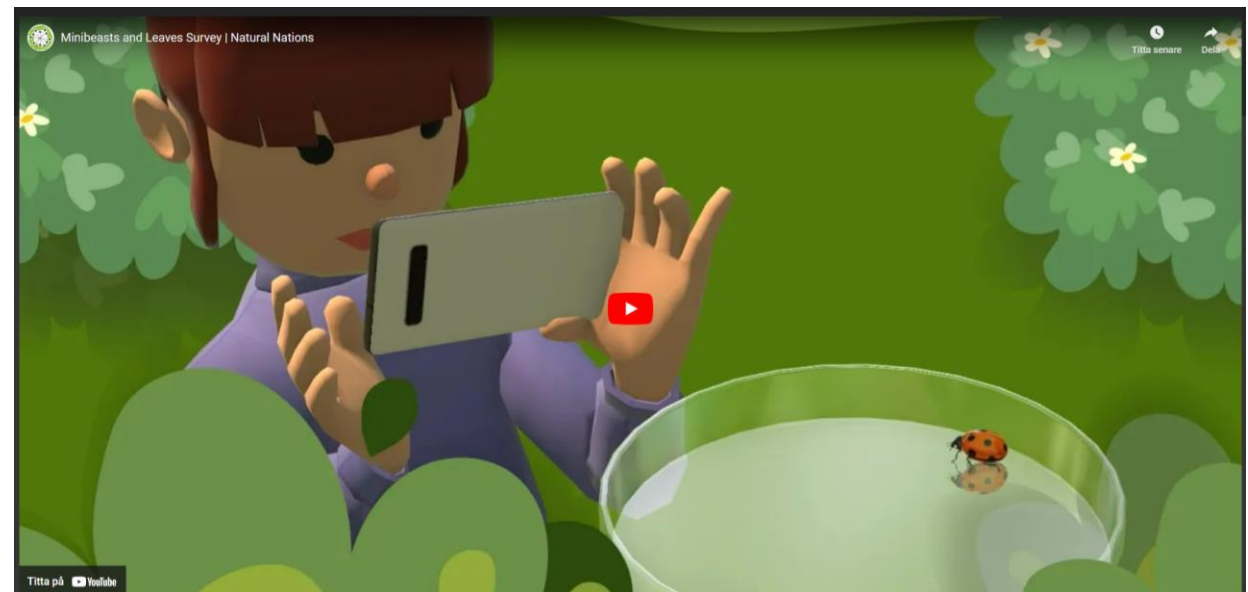
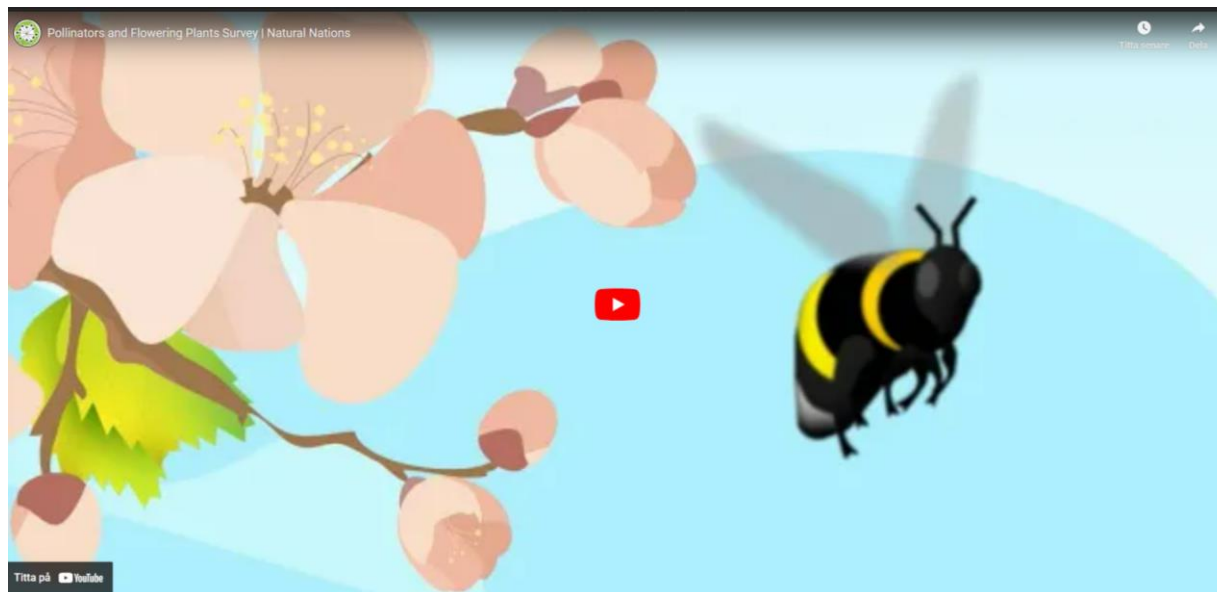
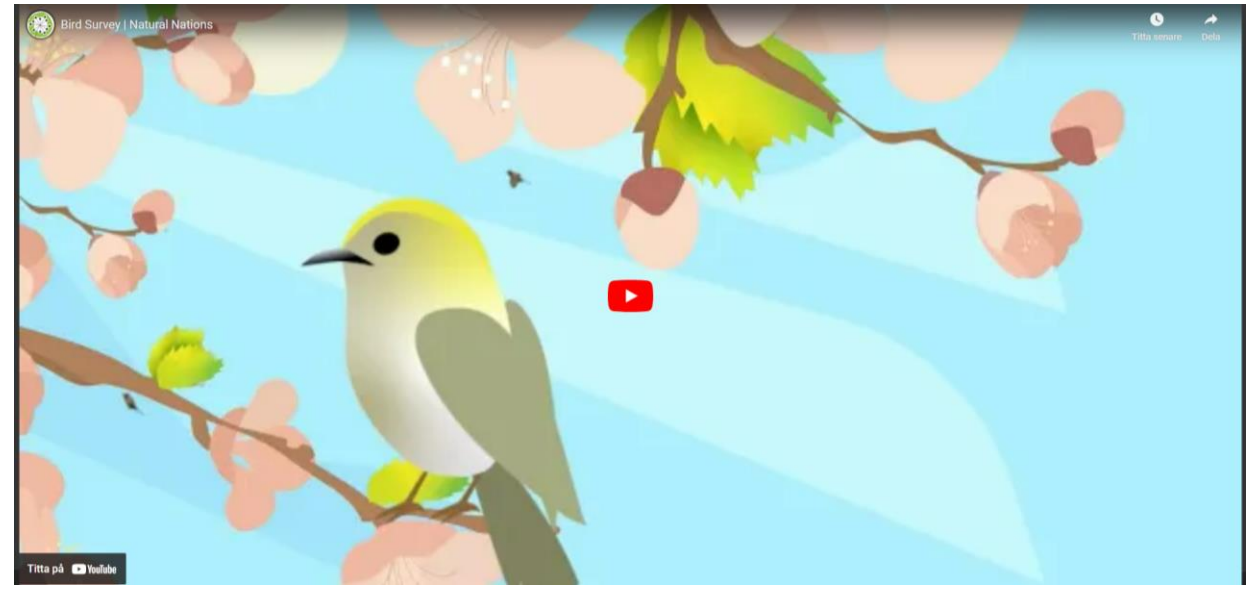
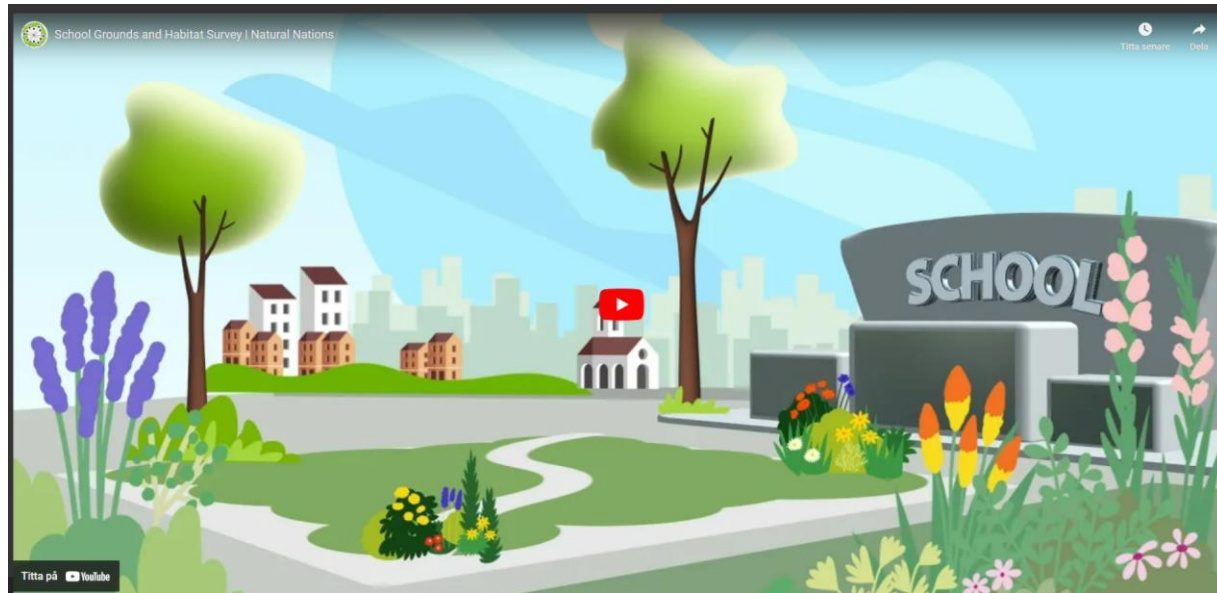
## Funders and partner organisations

### Green Recovery Challenge Fund





# Instruction videos for surveys





Survey 1 (S1)

S1

School grounds  
and habitat  
survey

Spring





## Survey method

### Step 1. Habitat Survey






If school has no trees this survey in school collection. Then repeat nearby green space to aid

Split into groups of 3-4

Use the habitat guide (next page) to fill in Table 1, noting what habitats you can find in your school grounds.

Table 1. Type of habitat

Food resource 	Plant beds or flowerpots	
	Tall grass, wildflowers	
Trees and shrubs		
Nesting places and shelter 	Bare ground (soil, sand, gravel, etc.)	
	Number of man-made homes overall _____	Bird homes (e.g. bird boxes)
		Wild bee homes (e.g. bee hotels)
		Honeybee homes (e.g. bee hives)
		Minibeast homes (e.g. bug hotels)
		Others (e.g. rubble stone walls, hollow stems, dead wood) Specify below:
Damp places		
Other 	Short grass (e.g. mown as lawn)	
	Bare walls or fences	
	Concrete or tarmac	

From the habitat survey in Table 1, which habitat type below is the most dominant, and second most dominant in your grounds?

### Feeding Habitats

#### Flower beds or pots



Includes flowers in planters or pots, raised beds and borders

#### Tall grass and wildflowers



Includes wildflower meadows and grassy verges

#### Trees and shrubs



Includes trees, orchards, shrubs, bushes and hedgerows

### Nesting Places and Shelter

#### Bare ground



Includes exposed flat or raised ground with low vegetation cover

#### Man-made homes



Includes bee hives, solitary bee hotels, bug hotels, bird boxes etc.

#### Damp places



Includes ponds, ditches, compost heaps and log piles

### Other:

#### Short grass



Areas where grass is mown, or grazed by animals

#### Bare walls and fences



Includes brick or stone walls and wooden or metal fences

#### Concrete or tarmac



Includes paths, roads, car parks and playgrounds

## Table 2. Species of Trees and Shrubs

Ex. 1: You were able to identify the tree or shrub species.

Ex. 2: You were able to identify the tree or shrub group.

Ex. 3: You did not know what the tree was but saw 9 that looked very similar and so you grouped them together (this is perfectly acceptable!).

Tree/Shrub/Unknown	Species/Group	How many?
T	Ex. 1: Common Oak Tree (Quercus robur)	2 or II
T	Ex. 2: Oak tree (Quercus spp.)	3 or III
U	Ex. 3: Unknown 1	9 or IIIIIIIII

## Table 3. Summary of Trees and Shrubs

If you were unable to distinguish between trees and shrubs fill out the unknown column.

	Trees	Shrubs	Unknown
Total number of tree and shrub individuals (to estimate total tree cover)			
Total number of different tree and shrub species/groups (based on shape and colour of leaves, flowers, fruits etc.)			



## Survey 2 (S2)

S1

School grounds  
and habitat  
survey

Spring



S2

Bird survey

Spring





## Recording sheet

Below are the 16 birds you may find

### Eurasian blackbird (*Turdus*)

Female



### Common chaffinch (*Fringilla*)

Female



### Great tit (*Parus major*)

Adult



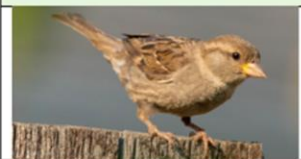
### Blue tit (*Cyanistes caeruleus*)

Adult



### House sparrow (*Passer domesticus*)

Female



### Tree sparrow (*Passer montanus*)

Adult



### White wagtail/Pied wagtail (*Motacilla alba*)

Adult



### Common starling (*Sturnus vulgaris*)

Adult



### Swift (*Apus apus*)

Adult



### Collared dove (*Streptopelia*)

Adult



### Robin (*Erithacus rubecula*)

Adult



### Wood pigeon (*Columba palumbus*)

Adult



### Redstart (*Phoenicurus phoenicurus*)

Adult



### Magpie (*Pica pica*)

Adult



### Eurasian blackcap (*Sylvia atricapilla*)

Female



### Sardinian warbler (*Sylvia melanocephala*)

Adult



Image credits

Bird illustrations by Victor Falzon. Photos of birds in flight and from the Public Domain.

## Any other birds?

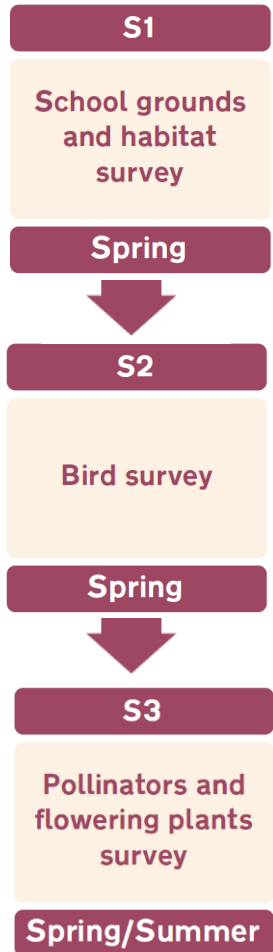
Sketch	Description	Present/Number seen

Sketch	Description	Present/Number seen

Sketch	Description	Present/Number seen



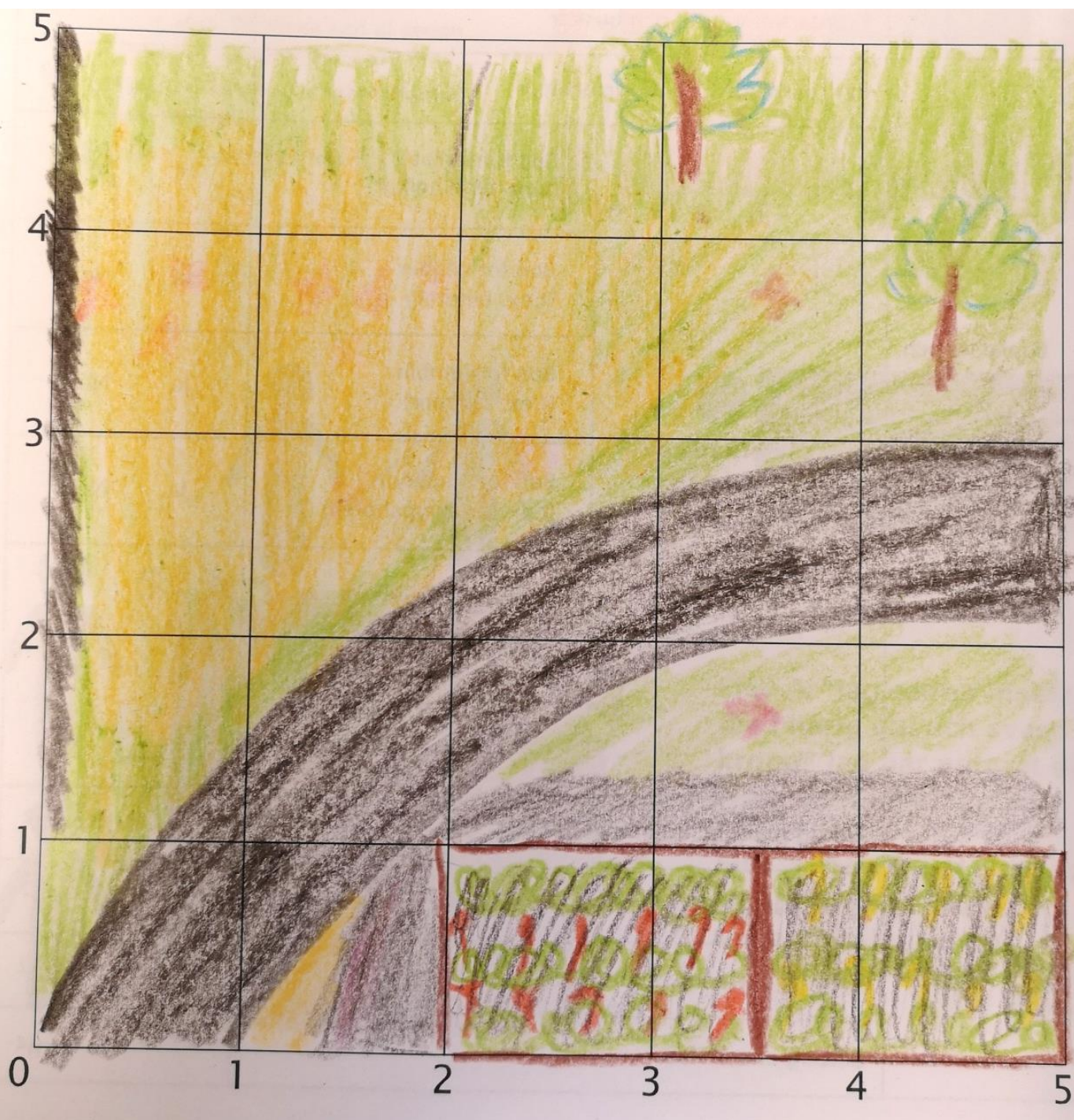
## Survey 3 (S3)




















### Step 5. Enter habitat types into table

Based on your drawing in the 5x5m area, estimate the number of square metres that each habitat type covers. Enter the number of square metres for each habitat type in the table below.












Table 1. Type of habitat		Estimate of m <sup>2</sup>	
Food resource 	Plant beds or flowerpots		
	Tall grass, wildflowers		
	Crown cover of trees and shrubs		
Nesting places and shelter 	Bare ground (soil, sand, gravel, etc.)		
	Number of man-made homes overall -----	Bird homes (e.g. bird boxes)	
		Wild bee homes (e.g. bee hotels)	
		Honeybee homes (e.g. bee hives)	
		Minibeast homes (e.g. bug hotels)	
		Others (e.g. rubble, stone walls, hollow stems, dead wood) Specify below:	
Damp places			
Other 	Short grass (e.g. mown as lawn)		
	Bare walls or fences		
	Concrete or tarmac		



Species group	Picture aid (Not all look like these – use photoguide!)	Total number seen	Total number of species (If you know the species/see features you can make a note here)
Example			Red-tailed White-tailed
Bumblebees			
Honeybees			
Solitary bees			
Wasps			
Beetles			

**Table 2: Pollinator table**

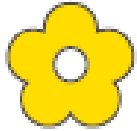

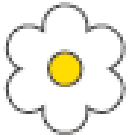

Tally the total number of each group you see and tally the total number of different species within that group. Include the name of the species if you know it!

Species group	Picture aid (Not all look like these – use photoguide!)	Total number seen	Total number of species (If you know the species/see features you can make a note here)
Example			Red-tailed White-tailed
Bumblebees			
Honeybees			
Solitary bees			
Wasps			
Beetles			
True bugs			
Butterflies			
Moths			
Hoverflies			
Other flies and mosquitos			



Name:

Table 3: Name of flowering plant species

Species/Group	Describe/Sketch
<p>Example 1. Buttercup (<i>Ranunculus spp.</i>)</p>	<p> Yellow, 5 petals, rounded petals</p> <p> Toothed + three offshoots (lobes)</p>
<p>Example 2. Unknown 1 (actually a Daisy, <i>Bellis perennis</i>)</p>	<p> Yellow + white, many petals</p> <p> Small + rounded</p>



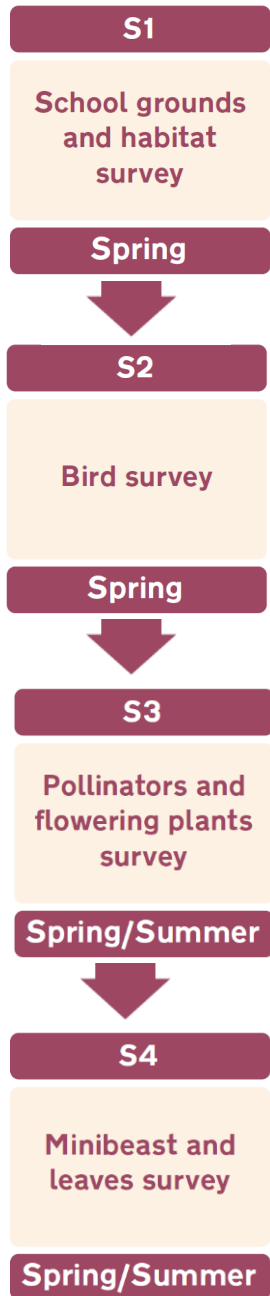
# Aims with Pollinators and flowering plants survey













- To become familiar with how to measure distance and angles to create a sampling area.
- To transfer real world habitats into a diagram and be able to estimate their coverage.
- To become familiar with identifying different pollinator groups using some key features.
- To estimate flower coverage and begin to observe and identify differences between flowers and plant species.



## Survey 4 (S4)





Species group	Picture aid	Total number seen	Total number of species
Earthworms (Annelida)			
Ants (Hymenoptera)			
Centipedes and millipedes (Myriapoda)			
Woodlice (Isopoda)			
Spiders and harvestmen (Arachnidae)			
Beetles (Coleoptera)			
True bug (Hemiptera)			
Insect larvae (Insecta)			
Snails and slugs (Gastropoda)			
Other, e.g. Crickets, grasshoppers, earwigs (Gryllidae, Caelifera, Dermaptera)			







# Data entry website – participate in Citizen Science!

The screenshot shows the Natural Nations data entry website. At the top, there is a green navigation bar with the text "Natural Nations" and a hamburger menu icon. Below this is a dark grey sidebar with several menu items: "School information", "Habitat (S1)", "Birds (S2)", "Pollinators (S3)", "Minibeasts (S4)", "Submit data", and "About us". The main content area features the Natural Nations logo, which consists of four circular icons (a butterfly, a flower, a bee, and a bird) above the text "NATURAL NATIONS". Below the logo is a form with the label "Select region and language:", a dropdown menu, and a blue "Select" button. A welcome message reads "Welcome to the data entry website!". Below this is an italicized note: "Important: note that you must download and email your answers to submit your data. Please read instructions below carefully." A bold heading states: "On this interactive website, you will be able to enter your collected data from each of the Natural Nations suite of four surveys:". This is followed by a bulleted list of the four surveys: "S1 School Grounds and Habitat", "S2 Birds", "S3 Pollinator and Flowering Plants", and "S4 Minibeast and leaves". A paragraph explains that results will be compared to other UK schools and participating European countries, and that the data will be used for a research project by Lund University in Sweden. A note in italics states: "\*Note\* If you plan to do more than one of the survey protocols (S1, S2, S3 and S4), please retain all the data and enter it altogether in one session. While the data will be temporarily stored on the webpage, you will need to complete the data entry within 24 hours and click on the 'Download data' button (see instructions on the 'Submit data' page via left pane navigation) to allow the data to be permanently saved. You can go back and correct values before clicking the download button." A thank you message follows: "Thank you for contributing to science!". At the bottom, there is a form with the label "Enter the name of your school:" and a text input field. In the bottom right corner, there is a blue hyperlink: <https://rshiny.nbis.se/shiny-server-apps/natural-nations/>

- School information
- Habitat (S1)
- Birds (S2)
- Pollinators (S3)
- Minibeasts (S4)
- Submit data
- About us



Select region and language:

Welcome to the data entry website!

*Important: note that you must download and email your answers to submit your data. Please read instructions below carefully.*

**On this interactive website, you will be able to enter your collected data from each of the Natural Nations suite of four surveys:**

- S1 School Grounds and Habitat
- S2 Birds
- S3 Pollinator and Flowering Plants
- S4 Minibeast and leaves

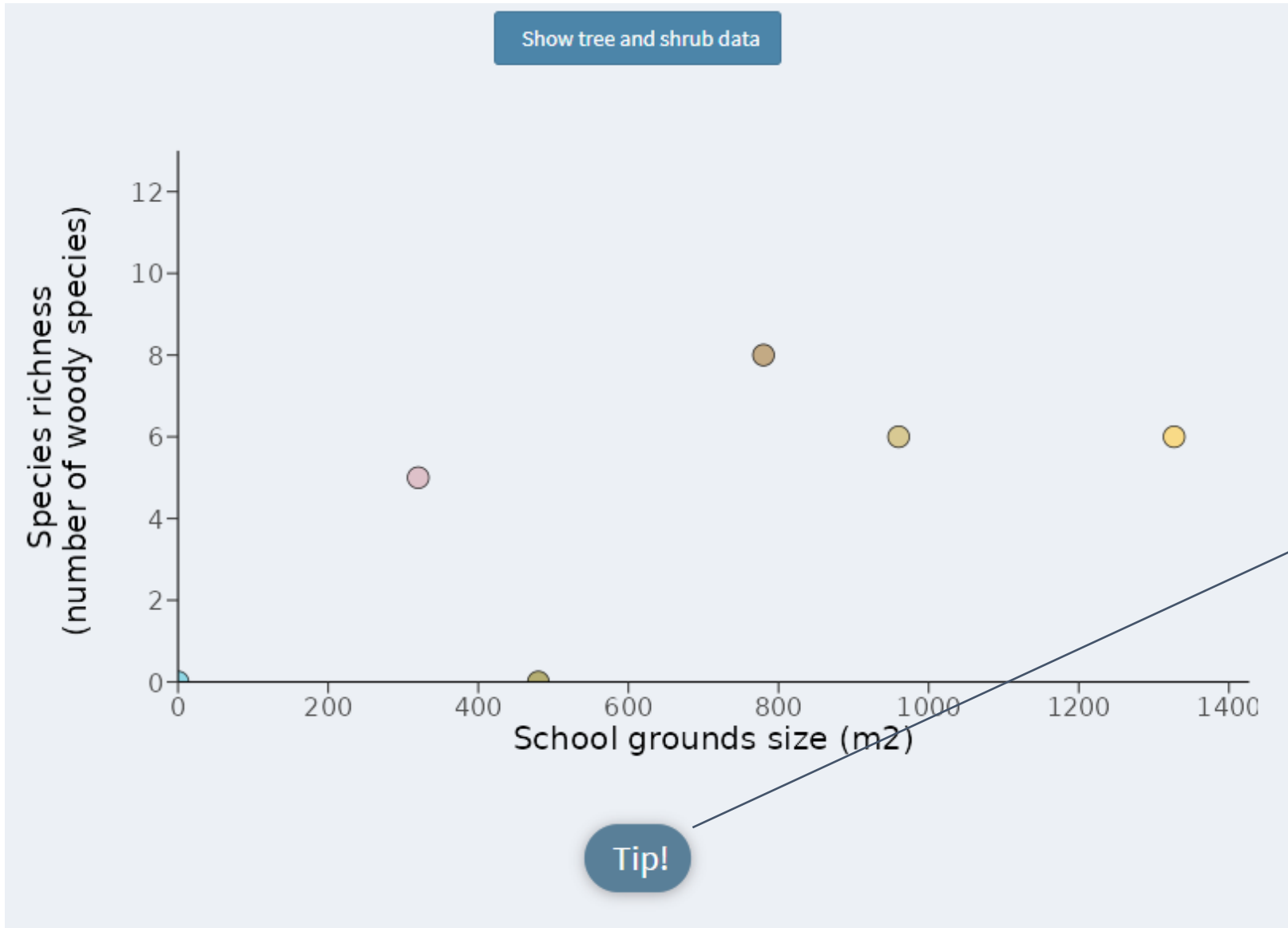
You will instantly see how your results compare to other UK schools and those in participating European countries. The valuable data will be used to inform a research project by Lund University in Sweden.

*\*Note\* If you plan to do more than one of the survey protocols (S1, S2, S3 and S4), please retain all the data and enter it altogether in one session. While the data will be temporarily stored on the webpage, you will need to complete the data entry within 24 hours and click on the 'Download data' button (see instructions on the 'Submit data' page via left pane navigation) to allow the data to be permanently saved. You can go back and correct values before clicking the download button.*

Thank you for contributing to science!

Enter the name of your school:

# Interactive graphs to visualise data



## About the graph

This graph shows the number of different tree and shrub species recorded by each school and how large the school grounds are. Question: Do you see any pattern? Do you need a large school ground to have many species of plants? About the graph: This type of graph is called a scatter plot. A dot high up shows that this school has a lot of species. A dot far to the right shows the school grounds are large.

Ok





Birds

# The flap challenge

Age: 7-14

Topic: Physical Education

Time: 30 minutes



Learning through Landscapes

If you would like to develop your outdoor learning knowledge and skills, take a look at our range of training courses: [ltd.org.uk/outdoor-learning-training](http://ltd.org.uk/outdoor-learning-training)

© This activity sheet was created by the Learning through Landscapes Trust. Registered charity no. in England and Wales 803270 and in Scotland SC038890

## What should learners already know?

- Birds have different methods of flight.

## What equipment will I need?

- Stopwatches
- Maths workbooks

## How will learners explore this?

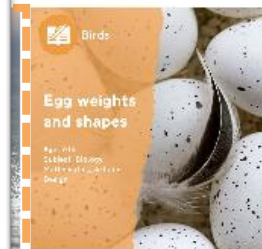
1. Go out into a large open space. Split children into pairs, and give each pair a stopwatch.
2. One child will flap their arms as quickly as possible while the other child times 15 seconds on their stopwatch.
3. The child flapping will count the number of flaps they do, and note it down. Children will now swap roles.
4. Now, as a class, ask children to flap at the pace of one wingbeat per second for a minute. Could they keep it up? Was this harder or less hard than flapping as quickly as possible for 15 seconds?
5. Back inside the classroom, multiply the number of flaps each child by 4. This is the wingbeat per minute each child managed to achieve.
6. Collect the wingbeats per minute of the class, and get children to calculate the mean, median and mode of the wingbeats.
7. Take the mean wingbeat, and look it up on the internet to find the bird that has the most similar wingbeat to you as a class.

## How can we show the learning?

- Use this exercise as an opportunity to discuss different approaches to flight that birds might have. Why might birds flap their wings very quickly? Why might birds flap their wings very slowly?
- Which is most tiring? Flapping quickly and slowly are both tiring! Sustained flapping slowly can make our muscles ache, but a short burst of quick flapping can make us out of breath.
- The fastest wingbeat seen in a bird is 80 wingbeats per second – that is 4,800 per minute! How did the class compare? Discuss with children why it might be useful for a bird to flap its wings that quickly.
  - This is because the hummingbird hovers in the air while it drinks nectar from flowers. Because the hummingbird wing is so small, it has a small surface area, meaning each flap does not generate much lift. Therefore, they must flap a lot! But this burns a lot of energy, so they do not stay in the air for very long at a time.
- The slowest wingbeat seen in a bird is just 1 per second, seen in the New World Vulture. Discuss with children why it might be useful to beat its wings that slowly.
  - This is because vultures soar high up in the mountains over vast areas looking for food; this means they want to stay in the air for long periods of time without burning too much energy. Their large wings have a high surface area, creating more lift per flap, and they use air currents to stay up in the air for long periods of time.
- Therefore, different species of birds have different approaches to flight, depending on their environment, diet and behaviour.

year! Enjoy the sunshine in your lesson ideas.

ists Pollinators



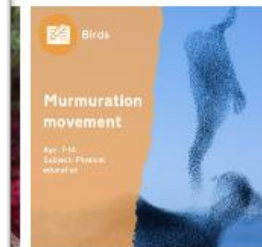
Egg Weights and Shapes

Download



How Do Birds Move?

Download



Murmuration Movement

Download



Create Birds

Download



Co-funded by the European Union



LUND UNIVERSITY



LUNDS KOMMUN



Naturskolan i Lund



SEO BirdLife



BirdLife MALTA



# Cultural Heritage Resources

[Birdlife Malta](#) have written a series of cultural heritage resources about some of the wildlife you might see in your school grounds. Download the resources below.

## Blackbird

Read this cultural heritage resource about blackbirds written by [Birdlife Malta](#).

[Download](#)

## Dandelion

Read this cultural heritage resource about dandelions written by [Birdlife Malta](#).

[Download](#)

## Earthworm

Read this cultural heritage resource about earthworms written by [Birdlife Malta](#).

[Download](#)

## Honey Bee

Read this cultural heritage resource about honey bees written by [Birdlife Malta](#).

[Download](#)

## Ladybird

Read this cultural heritage resource about ladybirds written by [Birdlife Malta](#).

[Download](#)

## Robin

Read this cultural heritage resource about robins written by [Birdlife Malta](#).

[Download](#)

## Stinging Nettle

Read this cultural heritage resource about stinging nettles written by [Birdlife Malta](#).

[Download](#)



## Different names

In science, it is known as *Lumbricus terrestris*. The generic Latin name "Lumbricus" means "worm", whilst "terrestris" means "terrestrial", "earthy", which leads to the most common name, "Earthworm"

In Malta it is called *hanex tal-hamrija* (soil worm), whilst in Swedish it is called *daggmask* (dew worm).

The Spanish and Catalan names are *Lombriz de tierra* and *Cuc de terra* respectively, both meaning "worm of the earth".

All these languages assigned a name that is descriptive of the habitat where the earthworm commonly lives, in moist soil.



## Funders and partner organisations

### Green Recovery Challenge Fund







## Increasing biodiversity: Planting a meadow

Katedralskolan high school, year 2

2 h work

8 square meters

8 tablespoons of meadow seeds





NATURAL NATIONS

Thanks for  
listening!

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[naturskolan@lund.se](mailto:naturskolan@lund.se)







Questions?