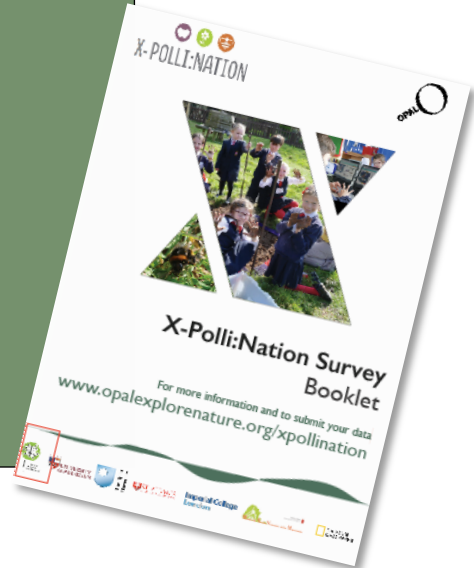




X-POLLI:NATION

Group Leader Support Guide

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What is X-Polli:Nation?

Thank you for participating in the X-Polli:Nation project!

X-Polli:Nation aims to create a ‘buzz’ for pollinators- both raising awareness about their decline and in doing so, bringing about actions to boost their populations.

The project is named after its aim to ‘cross-pollinate’ ideas between technologists, academics, citizen science practitioners and school children, resulting in improved and expanded pollination citizen science tools. It was inspired by the original Polli:Nation Survey and has been combined with other tools and approaches to improve the quality of data collected, monitor interactions between plants and visiting insect pollinators and collect information in new countries (now in Italy as well as the UK).

The project aims to provide schools with a package of resources to teach the full scientific process, where students:



Learn about pollinators and use our X-Polli:Nation digital training tool to help identify them



Record pollinators using the X-Polli:Nation Survey Booklet



Create habitat for pollinators using our species-specific Planting for Pollinators digital guide



Spread the word about conserving pollinators using our Polli:Promise campaign as inspiration

We hope that by taking part in X-Polli:Nation students will learn about the plight of pollinators, get involved in monitoring them and be inspired to work with their local communities to do their part for pollinators.

About This Guide

This Group Leader Support Guide is intended to provide teachers and group leaders with help in preparing and running the project. The following sections provide a list of items to be considered for each of these

stages, although it is not exhaustive. Please add or customise the suggestions as you find appropriate. All the project documents and links (including the Survey Booklet, Habitat Plant and Pollinator Guide and Recording Sheets) are downloadable from the X-Polli:Nation website: www.opalexplornature.org/xpollination



You will see this symbol in the Survey Booklet. It indicates that you will find additional information in this Group Leaders Support Guide.

Learning Objectives and Curriculum Links

Learning Objectives

By taking part in the X-Polli:Nation survey, participants will:

- Learn about pollinators and their importance
- Learn about plants and habitats and how they provide resources for pollinators
- Learn how to follow a scientific methodology for biological surveying

Curriculum Links

Although everyone can take part in the X-Polli:Nation Survey, in particular, it provides an opportunity for schools to carry out a scientific survey where the outcome is not known (it is not a 'fair test' style of science practical). It also allows pupils to carry out a safe, manageable and low-cost fieldwork activity within a timetabled lesson, and an opportunity to be part of a survey that makes a real contribution to our wider knowledge. The survey is designed to be repeated throughout the summer and early autumn as different pollinators emerge providing schools with their own 'big data' sets; these can run over many years and be compared to other schools or locations. Registered schools are taking part in southern England, so the links below are for the English Curriculum (however these activities will be relevant across all parts of the UK):

Primary age

- Y3: Plant life cycle and pollination; animals need the right types of nutrition
- Y4: Predator-prey relationships; food chains; classification groups and keys; a change in the environment can pose dangers to living things; water cycle
- Y5: life cycles; reproduction in plants
- Y6: Classification; pollination; water and nutrient transportation in animals and plants; adaptation and reproduction; evolution

Secondary age 11-14

The survey fits with National Curriculum KS3 Science SC1 2d; Sc2 5a, 5b. The survey also links closely with QCA Units such as: 7c Environment and feeding relationships, 8d Ecological relationships, and 9m Investigating scientific questions.

Secondary age 14-16

As well as an opportunity for independent research, the survey helps deliver aspects of GCSE Science:

- AQA Science (A&B) and Biology A. To analyse and interpret scientific data on environmental issues
- Edexcel Additional Science. B2.4 (Interdependence): 3. Investigate, using primary and secondary data, the impact of human activity on the environment
- OCR Science B (Gateway Science). B2a (Ecology in our school grounds): B2h (Sustainability), B2b (Grouping organisms)

The survey enables development of enquiry skills, such as practical skills; working collaboratively; communication of results: orally, in writing and using ICT; scientific thinking: explaining phenomena; critical understanding of evidence; research and study of science in a local, national (and global) context.

Health and safety



We want people to get outside and discover the benefits of the natural environment safely so would suggest that group leaders carry out a risk benefit analysis and refer to their organisation's guidelines and policies. X-Polli:Nation's approach to risk, and the methodology we use are evidence based and in line with official UK Government Policy, European Play and Education

Policy. Further guidance can be found at www.itl.org.uk/spaces/Itlriskbenefit.php. We recommend the following:

- Make a preliminary visit to the outdoor space and identify potential hazards in advance
- Take a first-aid kit along with a mobile phone
- Make sure everyone taking part is familiar with safety instructions and what to do in an emergency, e.g. assembly points
- Make sure that anyone requiring medication takes this with them
- Children of all ages must be supervised at all times. Make sure that there are sufficient adults for the number of children in the group. The survey is not suitable for children under the age of five
- Make sure that people wear appropriate clothing for the weather and time of year e.g. robust sensible foot wear with good grips on the soles, sun hat and sun cream (minimum factor 15)
- Make provision for hygiene, such as baby wipes or hand sanitizer and encourage participants to wash their hands after surveying. The 'All Pollinator' mix (labelled as Oddball) may contain foxgloves which can be poisonous if ingested.

Lesson planning

X-Polli:Nation suggests the following four lesson plans:

<p>Lesson 1: Raising awareness about pollinators <i>Learning about pollinators and how to identify them using the X-Polli:Nation training tool.</i></p> <ul style="list-style-type: none"> • What is pollination and what are pollinators? • Why do people need pollinators and which of our foods require pollinators? • Threats to pollinators • How can we help pollinators and what kind of habitat do they require? • What is the X-Polli:Nation project and what's involved in the lessons to come? • What are the features of the six pollinator groups? • What are 'Quest Species' and why do we want to study them? • How can we use a digital training tool to help us practice bumblebee and butterfly species identification? <p>Suggested dates: May-July 2019</p>	<p>Lesson 2a: Monitoring pollinators (<u>before</u> making habitat changes) <i>Recording pollinators using the X-Polli:Nation Survey and how to interpret the results.</i></p> <ul style="list-style-type: none"> • Introduction to surveying pollinators • A walk around the school grounds practicing insect identification skills and deciding on the areas in which to improve habitat and monitor quadrats • Marking out and photographing quadrats • Completing Part 1 of the X-Polli:Nation Survey booklet • Submitting your results <p>Suggested dates: June-September 2019</p> <p>Lesson 2b: Monitoring pollinators (<u>after</u> making habitat changes)</p> <ul style="list-style-type: none"> • Photographing quadrats • Completing Part 2 of the X-Polli:Nation Survey Booklet • Submitting your results <p>Suggested dates: June-September 2020</p>
<p>Lesson 3: Planting for Pollinators <i>Planning and planting seed mixes by using the Planting for Pollinators tool and Seedball mixes.</i></p> <ul style="list-style-type: none"> • What do plants need to grow? • What plants do different pollinators need? • Use of Planting for Pollinators tool • What are we planting? • Planting the seed mixes <p>Suggested dates: September- October 2019</p>	<p>Lesson 4: Campaigning for Pollinators <i>Using the Polli:Promise campaign as inspiration, reaching out to the local community to spread the word about pollinators.</i></p> <ul style="list-style-type: none"> • What is Polli:Promise? • What could we do in our community? • Distributing seed balls among the community • Spreading the word on social media #XPolli <p>Suggested dates: September- October 2019</p>

Supporting Information for Lessons

In an ideal situation, all lessons will be conducted with the **same cohort of students** across the two academic years.

Lesson 1: Raising awareness about pollinators

This lesson is focused on providing a solid introduction to the topic, so that students feel confident and excited to go outdoors and start monitoring, planting, and spreading the word.

Suggested Dates

We recommend you carry out Lesson 1 between May and July. Ideally Lesson 2 will follow shortly after so the identification process is fresh in students' minds.

Useful resources and links

Please feel free to use template slides provided and/or develop your own material about pollinators. Here are a number of useful links:

- Original Polli:Nation project resources: <http://polli-nation.co.uk/>
- Key Stage 2 video on BBC: <https://www.bbc.com/bitesize/clips/zfx76sg>
- Key stage 3 information on BBC: <https://www.bbc.com/bitesize/guides/zs7thyc/revision/2>

Equipment needed

- PowerPoint slides/images
- Habitat, Plant and Pollinator Identification Guides
- Laptops/tablets for your group

Suggested approach

You could begin the lesson with images or PowerPoint slides about pollinators and finish up the lesson by exploring the Identification training tool: <https://beewatch.abdn.ac.uk//beewatch/index.php?r=user/auth>.

Each student can create a login and practice identifying bumblebees and butterflies. We recommend spending 15 minutes on each insect group and trying out different difficulty levels, filters and the tips. Keep an eye out for the Quest Species and their differences from similar looking species. This will prepare students for Lesson 2.

Lesson 2a: Monitoring pollinators (before making habitat changes)

This lesson is all about taking part in a citizen science survey. It monitoring the habitats and pollinators in your school grounds before you have made any changes.

Suggested Dates

We recommend that you conduct Lesson 2a twice before the school holidays - once in June and again in July - when you are most likely to see pollinators. You could also repeat the lesson again in September when you return from the summer holiday to compare the results. Lesson 2a must have occurred before Lesson 3 (when you will plant seeds) and so needs to be conducted this year (2019).

Equipment needed

- Your Group Leader Support Guide
- Survey Booklets*
- Habitat, Plant and Pollinator Identification Guides*
- Cameras/smart phones/iPads*
- Thermometers
- 10m tape measure
- Stop clocks/ phones to keep track of time*
- Clipboards*
- Quadrats**

*The number of each item will depend upon the size of your group and the number of quadrats you create.

**A quadrat can be made by measuring out 1m between each corner and securing four sticks at this location. String can then be tied between the sticks to make the square.

As you may be surveying more than one time in the season, you may need more (black and white) recording sheets. These are available to download for free: www.opalexplornature.org/xpollination

Suggested approach

The survey is best carried out with students working in groups of three. One participant can record results in the survey booklet, another can take measurements and the third person can take photographs. If you have a large group, then you could create and survey multiple quadrats in each mix or rotate students through other pollinator linked activities, such as a walk around the school ground to find and identify other pollinators.

Choosing your site



Think carefully about your **survey sites** and **quadrats**. When looking, consider short grass or creating planters on concrete (classified under 'other habitats' in question 6 of the Survey Booklet) so that you will be converting an area previously less attractive to pollinators into one which should provide more feeding resources.

Your area **MUST NOT** be mown during the period of the X-Polli:Nation Survey.

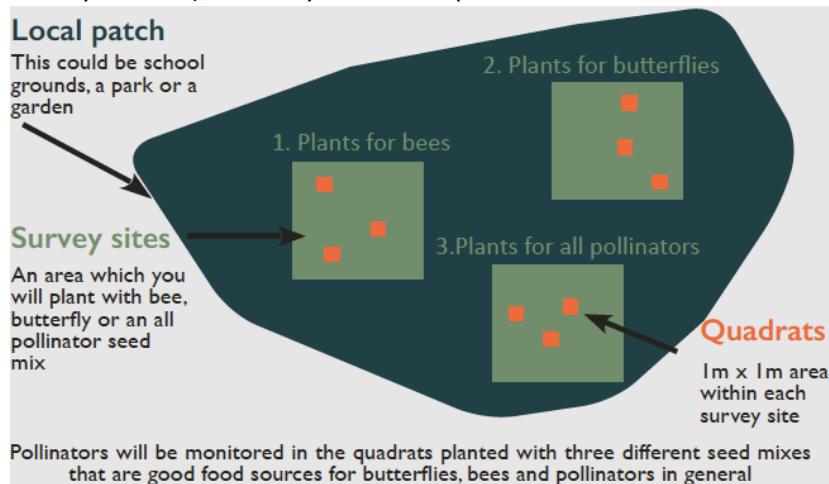
These sites will be where you plant your seed mixes. We have provided enough seed mix for you to cover a 10m x 10m area with some spare for you to share with the local community. Randomly select where you will create your quadrat/s within this area. This will need to remain in place over the duration of Lesson 2a and 2b.



You will need to take a picture of the quadrat, before you begin any work and give it a unique name. Please label them with the following code [school]_[seed mix]_[quadrat number]. For example, StA_Bee_1. This will be the first quadrat in the seed mix at St Albans School. You may have more than one quadrat in each seed mix (we recommend 9 in total). The minimum number should be three quadrats (one of each seed mix) e.g.:

- (1) 'StA_Bee_1' (2) 'StA_Butterfly_1' (3) 'StA_AllPolli_1'

It is important that you keep track of which quadrat you are monitoring (by labelling the quadrat and recording this in the Survey Booklet), so that you can compare the data before and after changes are made.



Please see below for examples of how St Alban's School dug over, marked out and labelled their quadrats. They used bunting to connect the four corners of the quadrats and decorated them according to the seed mix they were planting there i.e. with bees, butterflies or other pollinators.



Photographs

The Quadrats:



Please take three pictures at the different stages of the survey below:

Before changes:

When you have marked out the quadrats and are about to start Part 1



During changes:

When you have dug out the quadrats & scattered the seeds



After changes:

When the plants have grown and you are about to start Part 2



The Quest Species:



While students are carrying out question 11 and 25 of the Survey Booklet, one person should be responsible for taking photographs every time they see a pollinator land on a plant. Try and get the insect in focus (maybe take a few pictures to maximise the chances of getting a good shot) and get all the features in the frame. For example, if you are taking a picture of a butterfly, see if you can get the upper wing pattern and the lower side when they close their wings to help you with identification later. If you can get a picture of the plant it lands on, then this will help you in question 25.



This is really important as your photos will allow us to submit your data to biological records centres, making your survey even more useful for scientists!

It is assumed that any photograph sent to the OPAL website has the consent of the photographer to show the image on the OPAL website.



Filling out the Survey Booklet

The survey is split into two parts:

- Before habitat changes are made (Lesson 2a)
- After habitat changes are made (Lesson 2b)

Each part has three sections:

- Introductory questions (A)
- Habitats (B)
- Pollinators (C)

Since the number of pollinators flying on any given day is strongly related to weather conditions, participants are asked to record the amount of sunshine, temperature and wind.



Participants will need to sit quietly so that pollinators are not scared away. One member of the team uses a stop clock to time five minutes, while another records how many pollinator insects enter the quadrat - either by flying or landing on a plant. Use tally marks to count the number of pollinators in each pollinator group. The third person takes a photo every time a pollinator lands on a plant.

Data submission

After completing the survey, results should be entered online because this enables participants to submit an accurate geographical location for their survey site, and to upload pictures of the site and the pollinator

species. Please enter your results on the X-Polli:Nation webpage, ask your students to put their names on the Survey Booklet and keep them safe until you conduct Lesson 2b.

Lesson 2b: Monitoring pollinators (after making habitat changes)

Part 2 of the citizen science lesson monitors habitats and pollinators after you have made changes to school grounds.

Suggested Dates

This lesson will have to take place after Lesson 3 (when you plant seeds and they have grown) and so needs to be conducted next year (2020) from June-September.

Filling out the booklet

For this lesson you will need to fill out Part 2 of the Survey Booklet. Lesson 2b also has three sections, and below we highlight the similarities and difference between each part:

A. Introductory questions

These have the addition that you can record information about any improvements for pollinators you may have made to your area. This will allow us to monitor the Before and After effects on pollinators.

B. Habitats

Previously you recorded the broad habitats, this time you will record the actual plants that you see growing in the quadrats after you have planted your seeds. If you are using the Seedball mixes provided, then you are likely to find the species on page 11 & 12 of the Survey Booklet. These are species that are particularly good in providing feeding resources for bees, butterflies and a range of other pollinators. In question 20 of the Survey Booklet, students need to tick which ones they see in each of the quadrats, plus any other plants that germinate and grow if you can identify them.

C. Pollinators

Again, you will conduct two five minute timed searches (one for broad pollinator groups and one for pollinator species) but in question 25 you will be recording interaction data (i.e. which species of pollinator you see landing on which species of plants).



This is where photographs come in handy as you can refer back to them after the five minute search to help with identification.

Lesson 3: Planting for Pollinators

This lesson is all about creating habitat for pollinators in your school grounds.

Suggested Dates

We recommend that you conduct this lesson in September or October as the ideal time for sowing seeds is the Autumn. It will be easier to dig the ground and plant the seeds before the soil gets too frozen. Plant all three seed mixes at the same time, or if not possible, within one week.

Preparatory work before you go outdoors

You may like to teach students why certain plants are good for pollinators and you would be welcome to use any of the X-Polli:Nation training slides for this purpose. You may also like to run a computer session looking at the Planting for Pollinators tool: <http://www.abdn.ac.uk/beewatch/planting>

This will guide you through the plant species that are good for different species of bees and butterflies. Keep an eye out for the species in your seed mixes!

Equipment needed

- Trowel/spade
- Seeds
- Water
- Ruler to measure 10cm from the edge of the quadrat

Instructions for sowing

In Lesson 2a you marked out and labelled the sites that you were going to plant your seeds. Now it is time for sowing.



We have provided you with three packs of seeds, each with a different composition of plant species. These were selected specially so that one is particularly good at providing resources for butterflies (the butterfly mix), one for bees (the urban mix) and for a whole range of pollinators (the odd ball mix). They contain clay and a small amount of chilli powder to deter predators so all you need to do is sow them and water them.

As mentioned previously, each pack contains enough seeds to plant an area of 10m x 10 m so we encourage you to **prepare an area of 30m²** if you have the space. If not, please plant as big a site as possible, and a minimum of three 1m x 1m quadrats (which you should have already marked out in lesson 2)

Preparation depends upon the habitat which you are converting. If your first survey was on grass then you will need to remove the grass and leave bare soil (try and break up any large clumps and remove stones). If you are creating planters on concrete this will need more work but the end result is the same, a flat bed of soil without any debris.

You will need to sow 20 balls per m²:

- We suggest you encourage students to count out 20 balls
- Space them evenly over the prepared surface (with at least 10cm between them and at least 10cm from the edge to avoid competition from other plants)
- You do not need to cover the seeds with more soil
- Water them well. Continue to water these over the next few months if conditions are dry.

You will need to record the date which you plant your seeds in the Survey Booklet.

Lesson 4: Campaigning for Pollinators

This lesson takes the information your students have learnt and employs creative methods to spread the word about the importance of pollinators and how to protect them.

Suggested Dates

We recommend that you conduct this lesson in September or October in parallel with Lesson 3. By this time, students should have a good grounding in what pollinators are, how to monitor and how to create habitat for them. They will then be able to share their knowledge with their local community with the campaign.

Equipment

- Any art materials, seed bags or other creative equipment you wish to use
- The Butterfly and Bee Seedball mixes



Please do not send the Oddball mixes out into the community as they may contain foxgloves. These can be poisonous if ingested and while we can minimize this risk in the school environment, we cannot be sure of this at home.

Suggested approach

This lesson can be as creative and innovative as you and the students like. You can draw inspiration from Polli:Promise, a campaign that St Alban's School created to encourage their friends, family, local businesses, their MP and wider community to make a pledge for pollinators and plant a 1m x 1m plot. The Hive (a group of nature enthusiasts) made logos, a video and shared seeds. You can find out more information here:

<https://www.opalexplenature.org/polli-promise>

Part of the lesson could focus on dividing up the remaining Butterfly and Bee mixes into individual packets. Together with your students, we'd love you to create a way to spread the word in your community. Whether it's through music, dance, poetry, video, community happenings or some other method, it's up to you. You may consider holding an assembly, a themed day or your own launch event. Students could be given a homework task to spread the word about pollinators with at least 2 members of their community. We suggest you think about:

- Who are the audience you want to reach?
- What is the most effective way to communicate with this audience?
- What novel techniques could you employ to get your audience's attention and encourage them to protect pollinators?
- How will you share seeds with members of your community?
- How will you persuade them to make a pledge and share their photos using #XPolli



Interacting with Other Schools

Teacher's Network

In the original Polli:Nation programme there was significant benefit in sharing ideas and approaches with teachers and students from other registered schools. We will be contacting you to find out if you are happy for us to share your contact details with other teachers in the area so that you can do the same.

Pen Pal Scheme

Italian schools in Tuscany will also be taking part in the X-Polli:Nation programme. We see this as a unique opportunity for British and Italian students to interact and share their experiences of taking part in the project. This part of the project is very flexible but if you would like to take part, we will:

- Pair your school with an Italian School
- Put you in touch with the X-Polli:Nation facilitators in Italy and teachers at the school
- Students can write their PenPal a letter at key points within the year
- The batch of letters will be sent directly to the schools for students to respond to if they wish

Please let your facilitator, Claire Abercrombie, know if you would like to take part.

Celebratory Event

Italian schools will be starting their project in the Autumn. An event will be held to share lessons learnt and results from the English phase of the project as well as celebrate the second phase starting. We will keep you informed of dates and activities nearer to the time.

Further links and acknowledgements

Your Facilitator:

Claire Abercrombie: cabercrombie@ltdl.org.uk

Useful weblinks:

The X-Polli:Nation webpage: www.opalexplornature.org/xpollination

The Identification Training and Planting for Pollinators tools:

<https://beewatch.abdn.ac.uk/beewatch/index.php?r=user/auth>

The Polli:Promise campaign: <https://www.opalexplornature.org/polli-promise>

Social media: #XPolli

X-Polli:Nation Partners and Funder

