



LOCAL ACTION
ON BIODIVERSITY

SURVEYING BIODIVERSITY: TOOLS AND TIPS FOR EDUCATORS & YOUTH LEADERS

INTRODUCTION

The **Our Planet LAB Toolkit** outlines the steps that a class or group can take to monitor, study and improve local biodiversity. There are a wealth of digital and offline tools and techniques available to support this activity, and your choice of approach will depend on your local context, the needs and preferences of the young people taking part, and your plans for publicly showcasing your project locally or globally.

This guide introduces a selection of tools that individually or collectively help you to deliver and share your LAB project. You may wish to incorporate others that you feel more comfortable using.



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SEEK

The Seek app was created by iNaturalist in partnership with WWF, and launched as part of the suite of Our Planet resources for young people. Seek provides a fun and accessible way for young people to unlock the secrets of the natural world around them, identifying flora, fauna and fungi and discovering how the biodiversity of their local ecosystem fits in the big picture of nature on our planet. Live image recognition allows users to scan wildlife and identify it in real time, which helps young people to improve not only their knowledge of nature but their skills in obtaining an accurate visual record of wildlife observations.

Seek is designed to offer a fun, interesting and rewarding pastime for individuals that helps them tune into nature while organically starting to gain the knowledge and skills of a naturalist.

As well as offering this journey for individuals, Seek can enhance outdoor lessons, camps and nature excursions, and offers a powerful tool for group work. This guide will help you make the most of this versatile tool when bringing it into a group context - whether a classroom, youth group or youth engagement event.

For guidance on using the app itself to successfully capture and identify nature observations see the Seek User Guide, designed to offer a useful reference for nature explorers of all ages.

A FEW POINTS TO NOTE

- Seek requires internet connection to offer key functionality such as nearby species and ID of observations. See below for tips on using Seek and other tools with groups when internet enabled devices are not available.
- Seek is a safe, closed app for all ages until it is connected to iNaturalist, which requires confirmation that the user is over 13. If a user is under 13 the email of a responsible and authorised adult is required and the account must be set up by them upon receipt of an email with instructions. Through the Seek app users are not directly connected into exchanges with other users, and in order to monitor responses to their uploaded observations they would need to log on to iNaturalist.



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INATURALIST

One of the world's most popular nature apps, iNaturalist helps you identify the plants and animals around you. The app and website connects users with a community of over 750,000 scientists and naturalists who can help identify observations and provide insight into the significance. It draws upon the same species identification system as Seek, though does not currently have the live augmented reality interface that gives identification of wildlife in real time.

Observations uploaded to iNaturalist contribute to a database of research quality open source biodiversity data that scientists can draw upon to better understand and protect nature. iNaturalist is a joint initiative by the California Academy of Sciences and the National Geographic Society.

iNaturalist is a powerful tool, and although not designed for younger users it is intuitive and simple to navigate, and can be a great asset in an educational or youth group context.

iNaturalist has functionality that allows users to create **projects** that bring together observations by a particular group of users, in a particular area, in a particular timescale, or of particular species into one place for comparison and discussion. This allows you to have young people uploading observations using Seek or iNaturalist directly, and then you can collate them into a single page of records to get the full picture of your biodiversity survey. You can also share this body of data with other LAB groups or with others in your community who will find this insight useful or interesting.

There are different types of projects, and guidance on iNaturalist's website to help you identify the type that is right for you.

www.inaturalist.org/pages/managing-projects

iNaturalist allows users to upload observations even if the species recognition system has not been able to verify the exact species. This means that you can submit observations to the iNaturalist community with your 'best guess' for identification or with only partial taxonomy tagged, and others in the community can help

verify or identify your observation. Reviewing observations from other users and helping to identify the species where it is not yet verified is another way that young people can interact with biodiversity data, put into practice research skills and knowledge of taxonomy, and broaden their understanding of biodiversity in other global contexts.

A wealth of further guidance and advice on using iNaturalist for biodiversity surveys, including advice for teachers, can be found on the iNaturalist website:

www.inaturalist.org/pages/getting+started

A FEW POINTS TO NOTE

- iNaturalist offers a direct connection to an online community and users can message each other and comment on observations uploaded by others. The app and website enables users to upload photos and data that can then be viewed and downloaded by other users and public visitors to the website. This functionality means that there are risks for young people that iNaturalist cannot be responsible for mitigating, and the tool is not suitable for unsupervised use by under 13s.
- Inappropriate or poor quality observations uploaded to iNaturalist undermine the value of the tool for other users, and it is important that educators and youth leaders take responsibility for ensuring that projects with young people do not lead to the community being swamped by poor quality data.
- For these reasons, Seek offers a safer and more controlled tool for groupwork with younger people, while also incorporating design and functionality that makes it more engaging for young people.

OFFLINE RECORDING TOOLS

The Our Planet LAB toolkit includes printable recording sheets that are designed to capture all key information about a wildlife observation to allow it to contribute to a local biodiversity survey.

See below (p06) for further guidance on completing these forms, and instructions for uploading offline observations in bulk to iNaturalist.

Recording with these tools can be made easier with magnifying glasses and binoculars, and it is useful to use digital cameras to record observations alongside field notes and sketches where this is possible.

You may find that the best approach is to use a combination of these tools in order to achieve the results you want in terms of both accurate data collection and learning objectives.

The following three models are examples of the different approaches you can take when setting up and coordinating your LAB project.

SEEK – LOCAL APP ONLY

When might this be the best approach?

- Younger age groups (under 13)
- One-off lessons, workshops or outdoor activities not contributing to a longer-term biodiversity survey
- Lessons or sessions focused on specific short-term learning objectives or skill development, rather than contributing to a LAB project

As a local app Seek supports and enhances exploration of the natural world on an individual or small group basis, and provides experiences and discoveries that can be unpacked and discussed in pair-work or group plenaries.

If a user scans an organism and all seven levels of taxonomy are successfully recognised (shown by the seven on-screen dots turning green and a 'species' ID being displayed) then they can capture the photo and be sure that they will have recorded a wildlife observation that will count towards badges and/or challenges. If the app cannot recognise the exact species, however, this will not be possible. The user can still capture a photo, however, and this will be recorded to the device they are using to be discussed and potentially identified through other means.

Seek badges and challenges can be set as tasks for young people to complete individually or in pairs or small groups. This provides a defined task with an in-app reward, and the results can be reviewed and discussed in small groups or whole-class plenaries.

Some or all photos recorded during these activities can be downloaded or emailed from devices into a central repository, and then presented online or locally by the teacher or youth leader.

SEEK – LINKED TO INATURALIST

When might this be the best approach?

- Older age groups (over 13)
- Longer term LAB projects involving repeated bioblitz events or ongoing monitoring of a patch
- Groups connecting to other LAB projects around the world via Skype Collaborations

Seek can be connected to iNaturalist to allow species observations to be uploaded to iNaturalist where they can be reviewed online and verified by other users to contribute to research-grade biodiversity data.

Projects can be set up to bring together observations by your users, though as you will be focused on a particular patch you can also just view this site on the iNaturalist map to see all observations of wildlife made in that area before and during your project.

Young people you work with should be well briefed on the quality standards for observations, and encouraged only to upload observations they feel are appropriate. Alternatively, you could set the rule that no observations are uploaded during a bioblitz or outside group sessions. Then you could review observations as a group and decide when something meets the criteria to be uploaded. This can be a good way to ensure that you do not end up with multiple observations of the same organism on the same day, or repeated observations of the same plant by multiple participants over a longer recording period. This process of review and discussion can be a useful learning experience for the participants, as they consider how data will be used as well as focusing on the enjoyable process of recording.

To simplify and control the iNaturalist record of your survey even further you may choose to have just one account on iNaturalist through which all approved observations are uploaded. You could log on to devices individually with these credentials and upload selected photos from each, or consolidate photos from devices and manage the account from one device.

Note that when using Seek and/or iNaturalist it is not necessary for every young person to have a device. Exploration of the environment can be undertaken in pairs or small groups, and devices can be shared within these groups or put in the hands of 'roaming' individuals who can be called over by groups to scan and photograph wildlife they have spotted or captured.

OFFLINE RECORDING ONLY

When might this be the best approach?

- For younger age groups, or those who find devices difficult to use
- For biodiversity surveys where devices, internet connection or electricity are unavailable
- For LAB projects focused entirely on local objectives and not on global connections
- Where learning objectives are more important than building up biodiversity data for the patch
- For bioblitzes involving large numbers of people of varying ages and experience levels

Field notes and sketches remain a great way to record findings from a bioblitz, or to capture wildlife observations over time.

Learning to observe and record in this way is a useful learning experience for young people, as it trains them to look in detail at wildlife when searching for the defining traits of an organism. The powerful Seek and iNaturalist apps can make the process

of identifying a species quicker and more rewarding, but can lead to young people 'collecting' observations with minimal interaction with nature, rather than using their senses to really explore and experience the natural world.

Offline records collected through field notes and sketches also sets up a useful second stage of a biodiversity survey – researching in books or online wildlife encyclopaedias to identify what species they spotted. Working out the species of something through reference books is a great way for young people to gain a better understanding of classification, and offers a perfect groupwork task.

Your completed recording sheets may make a good display for your school or community.

In order to get the best of both worlds, it is useful to have **digital cameras** or **devices with cameras** to record wildlife observations in addition to the offline recording form. This can help you to assess the accuracy of sketches of field-notes, and can allow the species recognition tools in Seek and iNaturalist to be used to confirm or support offline species identification.





OFFLINE WILDLIFE OBSERVATIONS – EDUCATOR GUIDE

The Wildlife Observation worksheet is designed to capture everything you need to upload records to iNaturalist via the website even if you don't have a photo. The same information is useful for attempting an ID from field notes using reference books or online wildlife guides, and for adding observation pins to your own online or offline biodiversity map.

Completed observation records can be kept for public display at events and talks put on to engage the community in your Our Plant LAB project, and could be scanned or photographed for a digital archive. You may even wish to produce a booklet featuring a selection of the best as a memento of the project.

LOCATION

Depending on the size of your patch you may be able to let participants leave this blank and simply supply the same OS grid reference or longitude/latitude for each. For your own biodiversity map of your patch you may want a more precise location marked on a communal map or added to the online map by the participant.

To find out the longitude and latitude of a precise location using Google Maps follow the following steps:

1. Search for an address or the place you want to **locate** **Google Maps**. This will open a **Google map**...
2. Drop a pin. Click on the exact location you'd like coordinates for...
3. Right-click on the pin and select "What's here?"...
4. **Get** your location's **latitude and longitude**.

BULK UPLOAD OFFLINE RECORDS TO INATURALIST

For records with a photo it is best to upload the record using the website or app and select the photo file to submit it in the usual way. If you run a bioblitz and have a large number of observations with no photos to upload to your iNaturalist account at once you can enter them all into a spreadsheet (template provided), save it as a csv, and upload hundreds in one go. For full instructions click on 'Upload' and select 'more import options' and click on 'CSV'.

All observations will be attributed to the same account, so you will need to keep local records. You can add them all to a project if you have one set up for your LAB project.

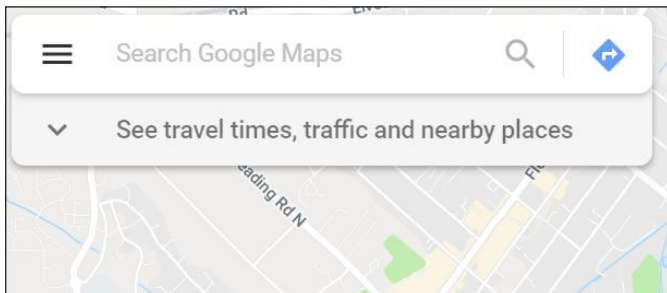
FIELD SKETCHES

Encourage participants to concentrate on capturing the most distinguishing features of the organism – the shape of the beak on a bird, the gills on a mushroom etc. Ask them to label their sketch with annotations to highlight key features, colour variations, texture and movement that the sketch cannot capture.

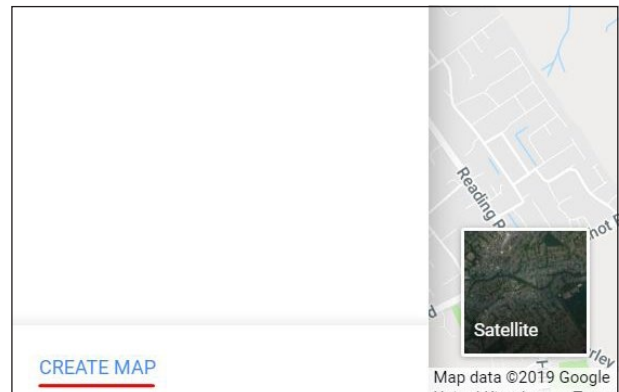
APPENDIX: HOW TO CREATE A DIGITAL BIODIVERSITY MAP OF YOUR PATCH

Step 1: Visit <https://maps.google.com>

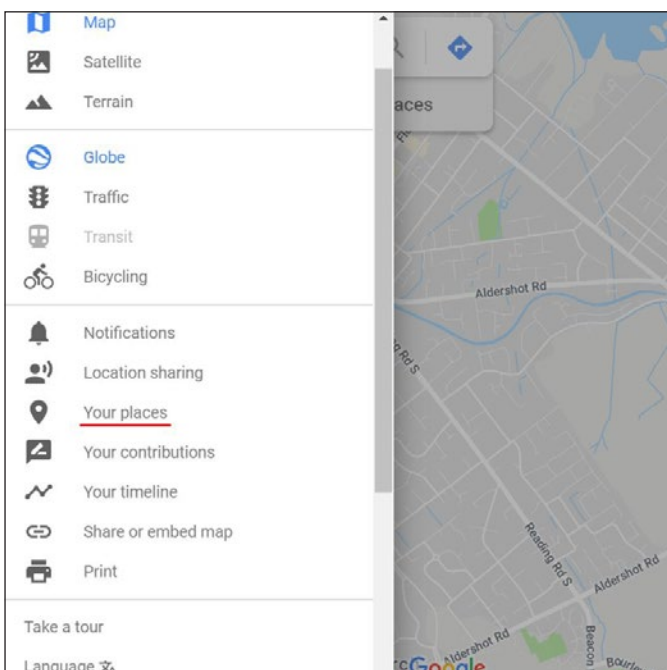
Step 2: Click on the three parallel lines to access the Maps menu.



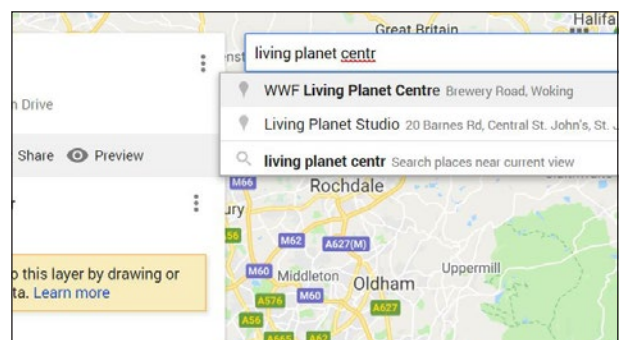
Step 5: Look to the bottom of the page and click on 'create map'.



Step 3: Scroll down the menu to find 'your places' and click on the link.



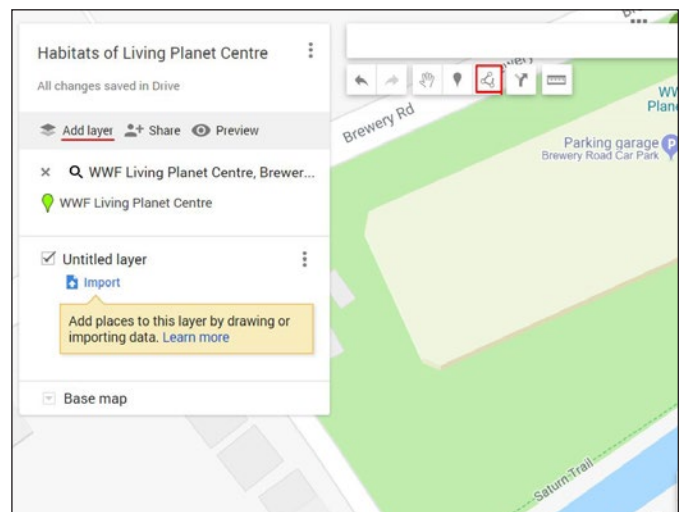
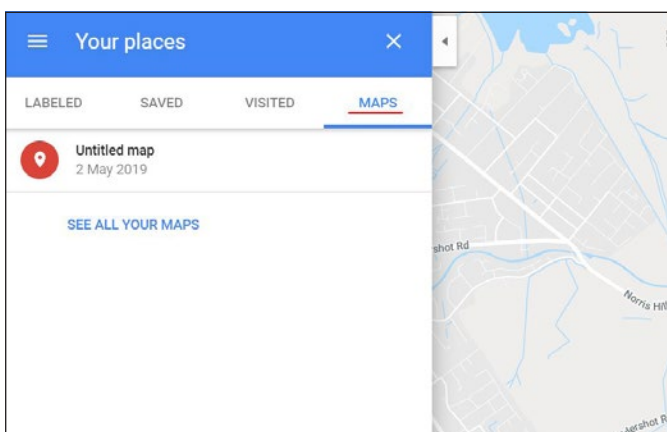
Step 6: In the top right box, search for the location you want to map.



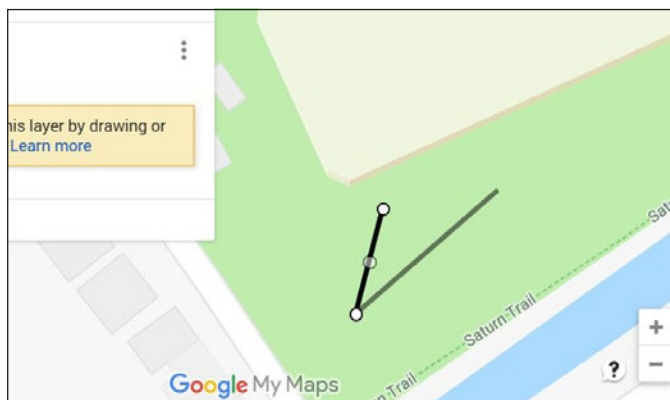
Step 7: Name and add a short description to your map.

Step 8: To create a layer, click 'add layer' and click on the draw symbol. From the drop down menu, select 'draw a line or shape'.

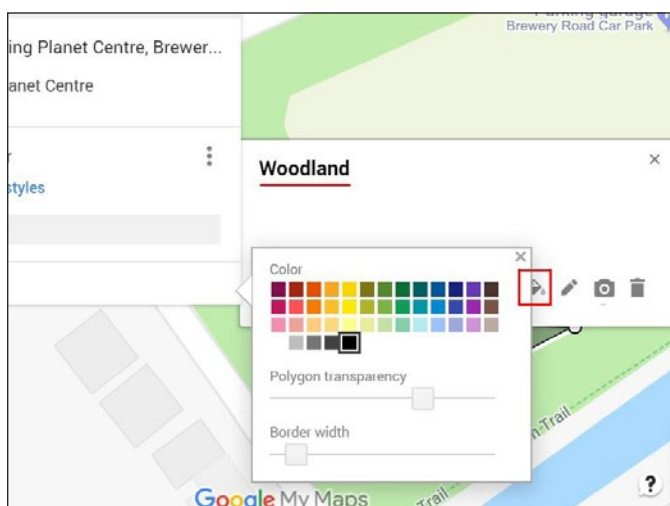
Step 4: Click on the 'MAPS' tab.



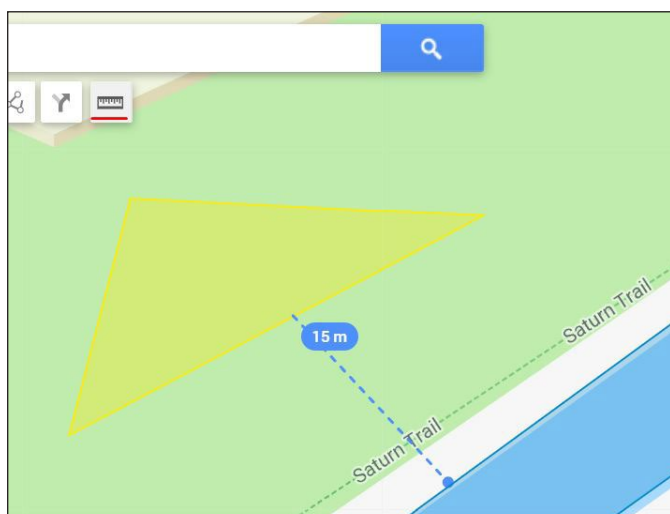
Step 9: Using the draw tool, you can begin to map areas reflecting the different habitats in your local area.



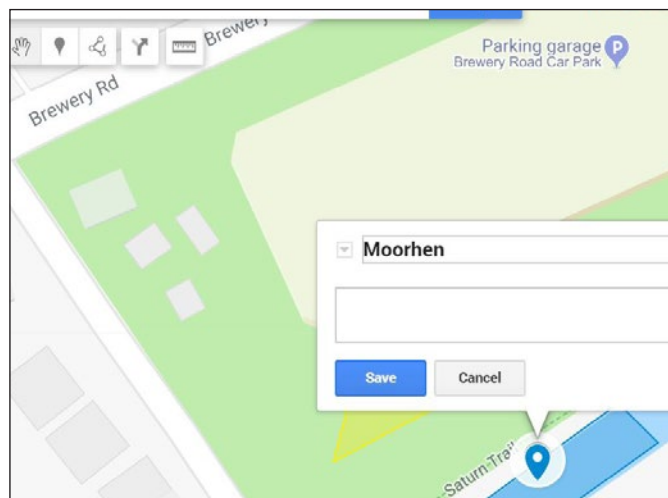
Step 10: You can label these, and using the paint bucket tool you can highlight each layer in different colours to differentiate between them.



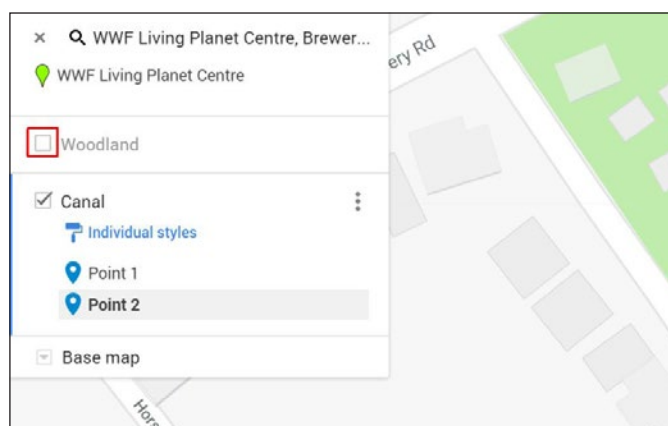
Step 11: Using the ruler, you can measure how far it is between each 'habitat' or layer.



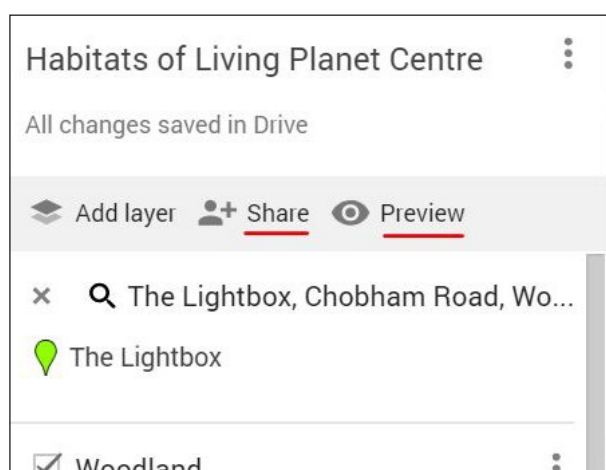
Step 12: The marker tool allows you to drop points of identification where you have seen wildlife.



Step 13: By unticking the box next to each layer, you can also hide layers as necessary, for example if you wanted to focus on a specific habitat.



Step 14: You can also preview and share your map with others, for example other teachers and schools.



SAMPLE BIOBLITZ ACTIVITY PLANS

5-11 YR OLDS

INDOORS

1. If possible show the 'What is Biodiversity?' film (ourplanet.com/biodiversityvideo) and any guide videos for the tools you are using.
2. Explain to your class that you will be exploring the biodiversity of your 'patch' (eg school ground, park or local green space) and sharing the information with people from all around the world (just like a professional naturalist would).
3. Discuss why this might be important to do (knowing what is there allows us to monitor change, address issues etc).
4. Ask the class what they expect to find in the area they will explore (make a list).
5. Discuss the rules for observing nature without hurting wildlife.
6. Aim to cover these points:
 - ✓ Be calm and quiet – otherwise any living things might hide.
 - ✓ If you are going to touch a creature, be very gentle – they are delicate so do not harm them.
 - ✓ Make sure you return any creatures to where you found them.
 - ✓ Tread gently, there might be a whole family under your feet.
 - ✓ If you move rocks or logs make sure you return them to the same spot.
 - ✓ Remember not to pick flowers or plants – they might be a family's home.

OUTSIDE

1. Brief your class in the tools you are using.
2. Divide up your patch into 'areas' and assign a group to work in each area with an adult. If possible each group should have a camera, or a tablet/smartphone with Seek or iNaturalist installed. If not, everyone should know who has one so that they can call them over and take photos of their findings.
3. Working in groups pupils explore their area of the patch and take photographs of each natural thing that they see (plants, animals and fungi). If they are using Seek or iNaturalist it is important that they know to get approval of their photo and the completed record before it is submitted, so it might be good to use the app offline or establish the rule that only the teacher / group leader submits records.
4. If groups are working without a camera or device, it is useful for them to have small trays or containers to collect insects and keep them until they can make the record.



5. Call everyone together and collect in all the equipment. Ask groups to feedback to the class. For example: what did you find the most of? What was the most common plant or animal? What was the hardest to photograph? What did they enjoy most about using the app?

PLENARY

- How does it feel being a naturalist and observing things closely? Did they enjoy being part of an international programme?
- Why were different animals and plants found in different areas?
- What might affect the species that they found (for better or worse)?
- How could the environment be changed to make it friendlier for the wildlife they found, or other species that they cannot currently find there?

EXTENSION IDEA

- Celebrate BioBlitz results by creating a class display for the school. Student contributions can feature 'biodiversity superlatives' such as smallest, largest, fastest, slowest, slimmest, most colourful, best camouflage, most surprising, most common, rarest, and most dangerous.

SAMPLE BIOBLITZ ACTIVITY PLANS

12-16 YR OLDS

DURATION: 60 MINS

THEME: NATURE

SUBJECT FOCUS: SCIENCE

Lesson Objective: Work scientifically to carry out an enquiry, evaluate data and present findings

Resources required

- Magni-jars/magnifying lens
- ID cards if available
- Tubs, bug pots, trays
- 1+ devices loaded with the Seek or iNaturalist app (or digital cameras)
- Printed guides for the tools you are using

Adult Support

- Work with groups in different areas of the school ground (activity 3)
- Hand out and collect in equipment

INDOORS

1. STARTER – CLASS DISCUSSION

What is a BioBlitz and why is it important?

Write the word BioBlitz on the board. Ask students if they have ever come across the word before? Separate the word into 'Bio' and 'Blitz'. Ask students if they can work out what it might mean?

'Bio' means 'life' and 'Blitz' means 'to do something quickly and intensively'. Together they make 'BioBlitz', a collaborative race against the clock to discover as many species of plants, animals and fungi as possible, within a set location, over a defined period (often 24 hours). A BioBlitz usually comprises a group of scientists, students, naturalists and other members of the public working together. It is an informal and fun way to create a snapshot of the variety of life that can be found in an area as part of a genuine scientific survey. A BioBlitz can be carried out anywhere there is wildlife.



Why is it important to survey biodiversity?

Ask students to explain what the term 'Biodiversity' means. Discuss the value of this variety of life on earth. Ask students to come up with a value for each of the below questions (share predictions or play 'higher or lower' before sharing the answers).

1. Show the Our planet 'What is Biodiversity?' video (ourplanet.com/biodiversityvideo)
2. Prepare to go outside by reminding the students about expectations of working safely in the outdoors. Produce a simple class risk assessment with students identifying potential hazards, their associated risks and control measures that could be put in place to reduce the risks.
3. Separately, create a list of 'rules' that they should follow to ensure wildlife is also not hurt by their activity.
4. Remind students how to use the tools you have selected.

OUTSIDE

1. Divide up your patch into 'areas' and assign a group to work in each area. If possible each group should have a camera, or a tablet/smartphone with Seek or iNaturalist installed. If not, everyone should know who has one so that they can call them over and take photos of their findings.
2. Working in groups pupils explore their area of the patch and take photographs of each natural thing that they see (plants, animals and fungi). If they are using iNaturalist or Seek with a connection to iNaturalist it is important that they know the rules around submitting observations.
3. It is useful for them to have small trays or containers to collect insects and keep them until they can make the record.

4. Call everyone together and collect in all the equipment. Ask groups to feedback to the class. For example: what did you find the most of? What was the most common plant or animal? What was the hardest to photograph? what did they enjoy most about using the app?
5. Ask students to pay attention to the additional information that they can learn from Seek or iNaturalist. For example, the Latin name, taxonomy and distribution.
6. As well as collecting photographic evidence, where possible, remind students to note as much information as possible about their observation. This information may include more specific information on where the flora or fauna was discovered e.g. underneath a flower pot. This careful observation and recording of data follows the same process that naturalists would strive to do, as more detail is always valuable.

PLENARY

1. Call students together and collect in all the equipment.
2. Ask groups to feedback to the class. For example, what was the most commonly occurring living thing and the least? What challenges did they encounter? Were there any surprises or anything which was not possible to identify? What limitations can they identify to this style of data collection and could they suggest any improvements? How would they evaluate the reliability of the data they collected?
3. Share with your class that during the next lesson you will be looking at the class data, exploring ways to best present findings and drawing conclusions.

EXTENSION TASKS/HOMEWORK IDEAS

- Visit iNaturalist website www.inaturalist.org and explore the observations made around the world, the species recorded and the people taking part. Compare results from nearby projects/ other schools/ local sites/internationally and where possible apply to collaborate with another LAB project via Skype in the Classroom Collaborations (<https://education.microsoft.com/ourplanetlive>)
- Research the work of naturalists, for example David Attenborough, or explore the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.
- Plan a follow-up BioBlitz at a different time of the year to compare data.

