

Lesson plan: Conduct a BioBlitz using the iNaturalist app – Lesson 1

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

Recommended Resources	Duration 50 mins	Theme Nature	Subject focus Science	Age group Key Stage 3
<ul style="list-style-type: none"> • Magnijars/magnifying lens • ID cards if available • Tubs, bug pots • A guide for observing nature • iPads loaded with the iNaturalist app (refer to notes for log in details) • ‘How to use iNaturalist’ (see resources) • National Geographic Analysing BioBlitz data • State Of Nature Report (optional) 	<p>Learning outcomes for lesson 1 and 2 (differentiated)</p> <p>MUST: make and record observations and evaluate the reliability of data collection.</p> <p>Present observations and data using appropriate methods, including tables and graphs.</p> <p>SHOULD: interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions.</p> <p>Identify possible improvements to data collection.</p> <p>COULD: evaluate data and show awareness of potential sources of error.</p> <p>Identify further questions arising from their results</p>			<p>Keywords</p> <ul style="list-style-type: none"> Naturalist Cultivated Captive Hazards Risks Taxon Biodiversity BioBlitz

Adult Support

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

Follow up activities

- Analyse the data collated by participating in Lesson 2
- This activity would work well as part of a wider scientific enquiry exploring sampling strategies and methodology

Background Information

This lesson has been written to celebrate City Nature Challenge. Over 400+ cities will be working together globally to collect as many wildlife observations as possible and engage the most people possible. For more information visit www.citynaturechallenge.org

The lesson plan is divided into two lessons. The first could take place during the City Nature Challenge dates with the second lesson (data analysis and presentation) to follow.

In preparation for this lesson share with your class the app iNaturalist that they will be using for activity 2 in their school grounds/local space. You will need to set up a class account to keep student identities anonymous (see online guidance). Explain how the app is used and how they can explore the app themselves at home (see ‘How to Use iNaturalist Guide’).

Starter

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, including urban and rural areas, inland or coastal locations, upland and lowland settings. It is a very flexible concept: it’s up to you how many people to invite, how big an area to explore and what activities to include.

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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).

- How many plants, animals, and other living organisms on Earth have been identified and given a scientific name? (1.75 Million)
- How many species do scientists estimate there are on Earth? (7 million)

Source: National Geographic

Next, consider why studying and recording the diversity of life (biodiversity) is so important. If time allows, it may be useful to share some headline information from the [State of Nature Report](#) [2019].

Main activity

Prepare to go outside by reminding the students about expectations of working safely in the outdoors using 'A guide for observing nature' (see resources).

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.

Remind students how to use the app and share 'How to use iNaturalist' (see resources). In particular remind students of the words 'cultivated' and 'captive' as discussed on the guide.

Outside

Hand out iPads and ID guides with the iNaturalist app and class log ins. Divide up your school grounds e.g. playing field, flower beds etc and assign a group to work in each area.

Working in groups, students start exploring their sample area and record all plants and animals observed as they go. Group tasks can be divided up to include identifying different plants through leaf shapes, flowers etc, as well as collecting minibeasts to temporarily restrict their movement in magnifying tubs or pots to allow identification and, where possible, photographs could be collected. Any animals that cannot be photographed can be identified with ID guides and the name inputted into the app manually allowing it to be included in the data collated.

Ask students to pay attention to the additional information that they can learn from the iNaturalist app. For example, the Latin name, size and distribution. As well as inputting photographic evidence, where possible, remind students to annotate their observation by completing as much information as possible in the 'notes' section. 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.

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Plenary

Call students together and collect in all the equipment.

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 data? What was the level of accuracy for their class/local area/international campaign using the iNaturalist app.

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 for lesson 1 and 2

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

Curriculum links

Science Key Stage 3

Working Scientifically:

- pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- evaluate risks
- ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
- use appropriate techniques, apparatus, and materials during fieldwork and laboratory work, paying attention to health and safety

Lesson plan: Conduct a BioBlitz using the iNaturalist app – Lesson 2

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

Duration 50 mins	Theme Nature	Subject focus Science	Age group Key Stage 3
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Recommended Resources

- Data collated in previous lesson – make available to all pupils through the iNaturalist app
- Laptops with app installed and class page log in
- Coloured pencils
- [National Geographic Analysing BioBlitz data](#)
- Activity 1: use the worksheets available from National Geographic [worksheet](#) and [answer sheet](#)
- Activity 2: use [worksheets](#) from National Geographic
- Activity 3: use class graph [worksheet](#) from National Geographic

Adult Support

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

Follow up activities

- Further exploration into Taxonomy and the need for biodiversity

Learning outcomes for Lesson 1 and 2 (differentiated)

MUST: make and record observations and evaluate the reliability of data collection.

Present observations and data using appropriate methods, including tables and graphs.

SHOULD: interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusion.

Identify possible improvements to data collection.

COULD: evaluate their data and show awareness of potential sources of error.

Identify further questions arising from their results.

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Keywords
Naturalist
Cultivated
Captive
Hazards
Risks
Taxon
Biodiversity
BioBlitz

Starter

Without sharing any data or access to class results, ask students to populate your board with the different species that they remember finding during their BioBlitz investigation. This will jog their memories back to the BioBlitz and the methodologies used.

If time allows ask students to contribute species facts that they learnt whilst using the iNaturalist app. Examine the board as a class. Tally the total number of species that students remember.

Open your class project page on iNaturalist by searching for the location name. Students should now see the total number of species tallied on the left-hand side of the home screen in the green 'totals' box.

Were any students surprised by the number of species found in your sample area? Can they make any initial suggestions for these results?

Main activity

Activity 1 - Preview how to navigate iNaturalist to find observation data. (10 minutes)

Divide students into their working groups. There are 11 taxon groups, and each student group will be responsible for observation data with their assigned taxon group. Use the worksheets available from National Geographic [worksheet](#) and [answer sheet](#).

Make sure each group has access to a computer and the website inaturalist.org

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If the class has an account, they can log in using the class username and password.

Demonstrate to your class how to navigate around their BioBlitz project page, highlighting the website features. Demonstrate the 'Observations' button in the green and the 'Totals' box on the left side of the screen. Show students how to toggle between the different views of observations: map, list, and icon. Introduce students to the search filter. Review taxon group icons and checkboxes for threatened and introduced species. Show your students an example of filtering for a particular group, for example birds, then click 'Update Search' to show all birds in the results.

Activity 2 - Analyse BioBlitz observation data. (15 minutes)

Explain to the class that they will work in their small groups to analyse the BioBlitz observation data for one taxon. Then, they will collate their data in a class graph in order to visualize the biodiversity of their school grounds/local area. They will also analyse data for introduced and endangered species in their area and will consider the implications on the biodiversity in the school grounds/local natural space. Use the [worksheets](#) available from National Geographic.

Activity 3 - Present and analyse results. (25 minutes)

Each working group will present their findings in a one-minute presentation and add their information to the class graph. Each taxon should have two bars: one for number of observations and one for number of species identified. As one student presents the group's findings, another student can add total number of species, observations, most common species and any introduced and/or endangered species above their bar graphs on the board. Use [worksheet](#) from National Geographic.

As each group presents, instruct the other groups to add the graphs of each presenting group to their BioBlitz Taxa Graph worksheet. Ensure coloured pencils are available to students to match the colours on the board.

After all groups have contributed to the class graph, give students five minutes to examine the graph and look for patterns in the data, or any relationships between taxon groups, numbers of species and observations, and so on. Students should spend two minutes studying independently, then discuss with their group and prepare to share their conclusion. If helpful, use the following prompts to guide groups' inquiry processes:

- *Do any of these groups have a much higher number of observations than others? Why do you think that is?*
- *Do any taxon groups have a large discrepancy between the number of observations and number of species identified? Why might this be?*
- *Are there any patterns between the number of invertebrates and vertebrates identified? Explain.*
- *Think back to our first task when we learned the number of species of each of these groups. Do you see any relationships between the number of species globally and the observations from our sample area?*

Lesson plan: Conduct a BioBlitz using the iNaturalist app – Lesson 2

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Plenary

Discuss the above points with your class and ask for limitations to this scientific enquiry. This should draw out discussions about the snapshot in time approach that a BioBlitz has and that it is only one method of recording scientific data. There may be much more diversity at different times of the year, day, seasons, weather conditions and using different methodologies.

Extension tasks/homework ideas for Lesson 1 and 2

Visit iNaturalist website 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.

- Find out about 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.
- Celebrate biodiversity and show 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.

Curriculum links

Science Key Stage 3

Working Scientifically:

- pay attention to objectivity and concern for accuracy, precision, repeatability and reproducibility
- ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience
- make and record observations and measurements using a range of methods for different investigations and evaluate the reliability of methods and suggest possible improvements
- present observations and data using appropriate methods, including tables and graphs
- interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions
- evaluate data, showing awareness of potential sources of random and systematic error
- identify further questions arising from their results
- the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material