



Promoting enquiry-based learning A National Education Nature Park Guide

Carefully planned outdoor learning supports children and young people to develop independence in the skills of enquiry, creative and critical thinking and reflection. Encouraging learners to ask questions about the nature in their school setting does not, however, mean that as educators we need to have all the answers. Research highlights that learners (and teachers) can be even more engaged when they know that we are all learning and finding things out together, in a transformative learning process.¹ Whilst fulfilling substantive and disciplinary knowledge requirements of the curriculum, nature-based enquiry also provides an opportunity to embrace this transformative learning process as learners and educators develop a deeper understanding of their local area. Whether you are an outdoor learning expert, a science-specialist, or anybody who wants some support on nature-based enquiry, the aim of this guidance is to explore how enquiry can be effectively carried out as part of the National Education Nature Park.

What does enquiry-based learning look like in the natural environment?

Enquiry-based learning² allows learners to experience and explore the natural world around them by asking questions based on their exploration. Learners can be supported to consider how they might find out the answer to their questions and collect evidence to do so. Through supporting learners to develop the skills underpinning enquiry, they can develop resilience, independence, collaboration and communication skills.

Questions can be generated in many ways, but creating a rich learning environment in which young people have space to reflect on experiences and ask questions is an important part of enquiry-based learning. Different types of questions lend themselves to different types of enquiries. Although enquiry-based learning spans a range of subject areas, the following examples show how the science National Curriculum (DfE, 2013) can support nature-based enquiries:

1. **Comparative and fair testing** (Changing one variable to see its effect on another, while keeping everything else the same) e.g. Learners might compare which soil plants grow best in but keep the species of plant the same, or compare their habitats with those of a different school.
2. **Research** (Using secondary sources of information to answer scientific questions) e.g. why do some plants have different coloured flowers? Which plants are best to support climate mitigation? Learners may use books, talk to visitors, use websites or pre-prepared information to help answer their questions.
3. **Pattern seeking** (Looking for relationships and patterns between different variables or events) e.g. Is there a pattern in the types of animals we can spot in different seasons? Or does the temperature affect when birds migrate? What nature observations can we see from mapping habitats?
4. **Identifying, classifying and grouping** (Comparing similarities and differences to name, classify or organise things into groups) e.g. how can we find out the name of this tree? How can we

¹ Mezirow, J. (2008). An overview on transformative learning. *Lifelong Learn.* 40–54.

² Burke, M. (2021) Fast guide to enquiry-based learning. Royal Society of Chemistry.



identify what type of habitats we have in our school site? Young learners will first need to develop the vocabulary and observation skills to compare nature, focusing on things like colour, size, shape and smell. As learners gain more knowledge of plants and animals, they will begin to identify nature using specific criteria.



5. **Observation over time** (Observing changes that occur over time) e.g. what happens to our trees over each season? How do the changes in micro-climates (using the weather and micro-climate app) impact on plant growth? Often, observations over time allow learners to raise ongoing new enquiry questions.

Enquiries can also be informed by and inform problems, such as ‘Which plants would grow next to the entrance of school to make the school community happy and encourage more bees to visit too? Using a problem will provide learners with the opportunity to conduct meaningful enquiries.





What does skill progression look like in nature-based enquiry?

To carry out enquiries successfully, learners need to be exposed to, practice and use appropriate skills. Outlined in the National Education Nature Park curriculum progression documents, green skills take into account working scientifically skills (DfE, 2013) and geography fieldwork skills (DfE, 2013) as well as creative and critical thinking skills.

To support progression and allow educators to use nature-based enquiries as an opportunity for learners to practice and demonstrate the achievement of curriculum outcomes, this table can be used to show how some of the subject-specific skills can be developed alongside the green skills:

Nature Park Green Skill	Working scientifically skills	Geography fieldwork skills
Identification and ecology 	<ul style="list-style-type: none"> Asking relevant questions about nature and the environment Observing closely 	
Recording data 	<ul style="list-style-type: none"> Setting up simple enquiries Making systematic and careful observations, and where appropriate, taking accurate measurements and using standard units, using a range of equipment Gathering, recording, classifying and presenting data in a variety of ways to help answer questions Recording findings using simple scientific language, diagrams, keys, bar graphs, tables, charts 	<ul style="list-style-type: none"> Using a range of techniques and methods to collect fieldwork data (Quantitative data such as species counts, as well as qualitative data, such as recording people’s opinions in a survey)



Data interpretation 	<ul style="list-style-type: none">• Using results to draw conclusions, make predictions for new values, suggest improvements and raise further questions• Evaluating an enquiry	<ul style="list-style-type: none">• Analysing and explaining the patterns seen in the data that has been presented• Drawing conclusions and summaries based upon evidence from the data collected
Decision making and creative thinking 	<ul style="list-style-type: none">• Identifying scientific evidence that can be used to support or refute ideas or arguments	<ul style="list-style-type: none">• Evaluating and critically reflecting on the fieldwork processes to make decisions
Environmental stewardship and horticulture 	<ul style="list-style-type: none">• Drawing on scientific evidence to make responsible choices	<ul style="list-style-type: none">• Drawing on geographical evidence to make responsible choices
Communication 	<ul style="list-style-type: none">• Reporting on findings, including oral and written explanations, displays or presentations of results and conclusions	<ul style="list-style-type: none">• Processing and presenting fieldwork data in a variety of ways (graphs, maps, charts, diagrams, etc.)

What are the benefits of enquiry-based learning?

Having the confidence and independence to ask meaningful questions, and the skills to carry out appropriate investigations to answer them, allows children and young people to continue to gain a deep understanding of the natural world. It allows them to understand the relationship between evidence and informed action. As Ofsted (2021) identify, engaging in enquiry-based learning supports learners to develop an understanding of the enquiry process and how it is used to establish knowledge.

In the context of the National Education Nature Park, we also recommend ensuring that evidence informs action, demonstrating the value of enquiry in the change-making process.

Supporting Community Science

Community science is the collaboration between non-scientists and professional scientists in the pursuit of scientific knowledge. The non-scientists, known as community scientists or citizen scientists, contribute their skills, knowledge and time to answering genuine, real-world, scientific questions. Typically, community scientists contribute to the data collection part of



the research process, but more and more they are collaborating with professional scientists in identifying the research questions, designing the scientific methods, analysing and interpreting the data and communicating the findings.

Enquiry learning provides young people with the skills and confidence to participate in these collaborative research opportunities, and the community science then provides a real-world application of learning, which creates a greater meaning and relevance to the enquiries conducted. Young people can develop a deeper understanding of the scientific process by participating in genuine research, as well as a sense of citizenship through contributing to tackling real-world problems.

What are the considerations of enquiry-based learning?

Accessibility

For enquiry-based learning to be successful, it is important that learners have the appropriate knowledge (both substantive knowledge and disciplinary knowledge) to carry out an enquiry successfully. In Early Years Foundation Stage (EYFS) and Key Stage One, it is important that learners can conduct enquiries together, modelling and practicing enquiries and skills before conducting them independently. As learners gain confidence, they can begin to be given more opportunities to raise questions and decide which approach to use to carry out their enquiries. Supporting progression of appropriate substantive and disciplinary knowledge will enable learners to be successful in carrying out enquiries. For Key Stage Four and Five, it is increasingly important that learners develop autonomy and leadership in their enquiries.

Creating a positive and safe learning environment

The balance between autonomy and teacher guidance is always tricky and will depend on the learners, their experience outside of the classroom and their age and ability. Ensuring positive behaviour for learning, as with any enquiry-based learning, is about creating clear expectations for behaviour outside the classroom and ensuring thoughtful groupings of learners. Supporting a respectful culture which values different questions, ideas and experiences is important when learners are working together in their enquiries.

Ensuring learners will obtain useful and accurate findings

Enquiries will not always produce findings. Perhaps it is a dry day and there are no invertebrates to count, tall grass may have been accidentally cut before using sweep nets, it might be too cloudy to measure the shadow of a tree, or a group of learners simply did not get to the survey before the end of the lesson. As with all good teaching practice, always planning time for a quick evaluation and reflection can inform future learning. The following questions are recommended:

- What do your findings tell you?
- What do your findings not tell you?
- Did your enquiry help you to answer your investigation / enquiry question?
- Did you learn anything that you didn't expect to learn?
- What would you do differently if you did the experiment / investigation again?





Time (Planning, preparation and timetable integration)

Research³ highlights that learners spend more time on tasks outside the classroom and are more engaged. Dovetailing nature-based enquiries with learning in science and geography can add purpose and meaning to curriculum coverage. Worksheets and videos could be used to support with some aspects of enquiry-based learning and although the demands of the curriculum on timetables is heavy, enquiry-based learning can support multiple subjects and curriculum aims and experiences outside/ data collected could be used in other subjects (eg. creative writing for English, data used in Maths or Computer Science, experiences used as inspiration for Art or Design projects).

Being creative with your class time can also be an effective way to ensure learners can conduct focused skill development and mini enquiries: using time during registration, fifteen minutes before lunch or straight after break, outdoor learning does not always need to be a full lesson and can also support engagement⁴ in subsequent lessons.

A quick guide to scaffold enquiry-based learning:

1. Raise questions together, perhaps after a short outdoor activity such as **Points of view** or identify questions from a **KWHL activity** (try our downloadable template).
2. Decide on a question they would like to investigate.
3. Ask the learners to draw on what they already know about the question.
4. Discuss which enquiry approach might be the best to answer the question.
5. Develop a method for carrying out the enquiry (e.g. what will they observe, record) and decide whether you will do this as a whole class, in groups, pairs or independently.
6. Support the learners to think about how they are going to present their findings, thinking about their audience – will it be to the school governors, parents, other year groups?
7. Ensure learners can reflect on their enquiry, identifying further enquiry questions.



³ Norwood, M. F., Lakhani, A., Kendall, E., (2021). Teaching traditional indoor school lessons in nature: The effects on student learning and behaviour. *Landscape and Urban Planning*, 206, 1-10.

⁴ Jana Raadik Cottrell & Stuart P. Cottrell (2020) Outdoor skills education: what are the benefits for health, learning and lifestyle?, *World Leisure Journal*, 62:3, 219-241, DOI: [10.1080/16078055.2020.1798051](https://doi.org/10.1080/16078055.2020.1798051)



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