

Change – The transformative power of citizen science

## Boosting biodiversity in school grounds: a theory of change

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### Abstract

The National Education Nature Park aims to involve every nursery, school, and college in England in enhancing the biodiversity on their site, whilst supporting young people’s wellbeing, pro-environmental behaviours, and green skills. Young people gather environmental data using citizen science research, and then through collaboration and collective decision-making, they design and implement their own nature recovery actions. But will this participation in community and citizen science lead to behaviour change and environmental action, and how can we build participants’ sense of agency to take environmental action through our programme? Here, we present our Theory of Change for the Nature Park and the design features of the programme that connect participation in citizen science with achieving two crucial types of change - environmental change in the form of biodiversity gain, and the behaviour change that underpins it.

**Keywords:** biodiversity, community science, education, environmental science agency, theory of change

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### Introduction

Biodiversity – the range of species, habitats, and ecosystems in an area - is in a state of decline both globally and in the UK (Burns et al. 2023; IUCN 2020). Concurrently, many children spend little time outside in nature with potentially detrimental effects on health and wellbeing (Chawla 2020). The Dasgupta Review (Dasgupta

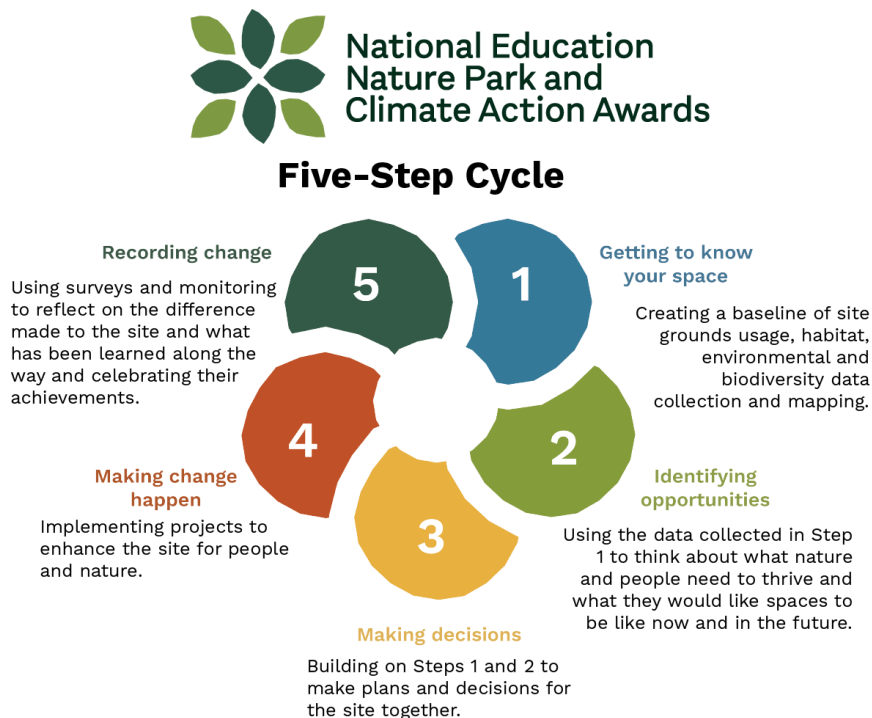
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2021) argues we have failed to engage with nature sustainably and calls for an urgent transformation of our systems, particularly education. England’s educational estate (the land occupied by all nurseries, schools, and colleges) is estimated to cover 514 km<sup>2</sup> (Department for Education 2021). By better integrating nature into school areas, we can increase biodiversity while increasing the health and well-being of children and young people, and educational outcomes. The National Education Nature Park (Hazell and Clarke 2024) aims to involve every nursery, school, and college in England in enhancing the biodiversity on their site, whilst supporting young people’s wellbeing, pro-environmental behaviours, and green skills. The programme focuses on building young people’s sense of agency to act and supporting them in gathering the data they need to make informed decisions about enhancing their learning spaces for nature, and for themselves.

## Methods

Unlike most projects which tend to be linear, the programme guidance is not prescriptive but suggests a five-step cycle for participants (Fig. 1). Educational settings first map their sites’ boundaries, habitats, and biodiversity using iNaturalist (iNaturalist 2024) and digital tools developed by Esri UK. This forms a baseline for schools to identify spaces to improve for nature and people, and to implement projects to enhance their sites. Using these digital tools, they will monitor these changes, and reflect on and celebrate their achievements. Activities are planned and delivered by educators, supported by learning resources developed by the



**Figure 1.** The National Education Nature Park Five-Step Cycle.

Nature Park team, and are intended to involve the whole school. By embedding pro-environmental activities within the programme itself, we hope for stronger outcomes.

Theory of Change (ToC) approaches were first developed in the US to evaluate complex community initiatives but are increasingly being used in the UK to evaluate policy initiatives (Sullivan and Stewart 2006). To guide the evaluation of the programme the team developed a ToC based on an academic literature review, the Dasgupta Review (Dasgupta 2021) and feedback from the delivery team and programme funder. The ToC connects the design, input and activities of the project to the expected outcomes.

As we evaluate the Nature Park, we will test and refine the connections between these different elements of engagement and outcome. Methods to evaluate the Nature Park and its alignment with the ToC include quantitative data collection, case studies and teacher surveys. An external evaluator will make case studies of ten educational settings per year to understand how they perceive the programme and how they have implemented it.

## Results and discussion

Since its launch in October 2023, more than 3,200 educational settings have registered for the Nature Park, including 11% of all primary and secondary schools in England as of June 2024. So far, over 100 participants have mapped their baseline habitats, and new wildlife areas created include ponds and green walls.

The Theory of Change (see supplementary material) suggests the activities within the Nature Park, including lessons on biodiversity, community science, and engagement activities will achieve an increase in biodiversity, promote pro-environmental behaviour, and enhance overall well-being. It is anticipated that, by spending more time in nature, young people will feel more connected to nature, and this predicts increased wellbeing (Capaldi et al. 2015; Mayer et al. 2009; Pritchard et al. 2020; Richardson et al. 2021) and pro-environment behaviour (DeVille et al. 2021; Mackay and Schmitt 2019). We have also designed the programme for children and young people to develop an identification with environmental science, roles within it, and a sense of agency to enact change, using the Environmental Science Agency (ESA) framework (Ballard et al. 2017a).

Based on the strength of evidence gathered some aspects of the ToC may be confirmed, while others may be rejected, leading to adjustments. Although we know that community science can lead to multiple research and conservation outcomes (Ballard et al. 2017b), the connection between doing research through community science and taking nature recovery actions is still not well established, so this is one of the key linkages in the Theory of Change that will be tested.

## Conclusion

In conclusion, the Theory of Change offers a promising framework for evaluating the Nature Park and assessing which activities could enhance knowledge of biodiversity, green skills, and nature connectedness. In the context of a Planetary Emergency, leveraging the vast numbers of people participating in citizen science will

be crucial for driving them towards meaningful action. Understanding which activities effectively inspire this action is essential for maximising the impact of these efforts.

## Acknowledgements

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