Citizen Science Guide

Citizen science can be a great tool for scientific discovery and engagement. It encourages people to take part in science and learn more about their environment.

Please see this guide as a starting point to help you to design and implement a citizen science project. The more you put in, the more you and your participants will get out of citizen science.

Before you start

Citizen Science?	• Consider whether or not Citizen Science is the best approach to answer your research question and how involving volunteer participants will benefit your project and the participants themselves.
Choose a citizen science approach	There are three different approaches: 1. Contributory projects: Designed entirely by scientists. Participants primarily collect, or in the case of crowd sourcing, analyse data. 2. Collaborative projects: Designed by scientists, but participants are involved in more than one stage of the scientific process (perhaps contributing or analysing data, helping to inform the way in which the questions are addressed or communicating findings). 3. Co-created projects are designed collaboratively: Scientists and participants or communities work together in partnership. At least some of the volunteer participants are involved in most or all steps of the scientific process.

First steps

Establish a project team	• Your project team should engage with all relevant stakeholder groups, eg. researchers who are interested in your project data, community groups, members of your club or society, landowners, and perhaps local and national businesses.
Define project aims	• Establish your project aims and ensure these are communicated effectively to citizen scientists.
Identify funding and resources	• Citizen Science can be a highly cost-effective approach, but it always requires resourcing in another way, e.g. time to develop materials and support participants, costs of promotional and training materials.
Identify and understand target participants	• In most circumstances one size doesn't fit all. Supporting materials generally need to be tailored to specific audiences and 'hooks' to attract publicity may also differ according to the potential participants. • Who you want to target as participants will affect the protocols, data capture systems and training approaches that you develop, and the style of language used for resources.

Development phase

Design the survey or scheme	• Keep the participant audience in mind as this will strongly influence what participants are able and willing to do, and the support mechanisms that you'll need to provide. • Consider your data requirements, available technology and funding limits.
Consider data requirements, storage and analysis	• The quality of data collected by volunteers is heavily influenced by the survey design, training materials and support that you provide. • Observe participants and identify the types of errors they make to understand how data quality varies between samples and use this as an opportunity to minimise errors. • Plan how you will analyse the data, how you will store it and who will have access to it.
Consider technological requirements	• Select technology appropriate for your target participants. By opting for a particular technology you will be implicitly engaging particular communities, so choose an approach that is both interesting and accessible to your potential participants. If physical items are required (e.g. sampling kits), remember that you'll need to distribute them
Develop supporting materials	• Well-supported citizen science participants produce higher quality data and truly engages with the community. • Training provides an excellent way to build skills and retain involvement in a project, and therefore provides rewards for participants and scientists alike.
Test and modify protocols	• To ensure your project has the best chance of success, test the survey protocols, data entry forms and training materials to ensure that they are fit for purpose.

Live phase

Promote and publicise the project	• Spend time planning how you will publicise and promote your project – this is critical to the successful recruitment of participants, and should be tailored to your participants. • The amount of promotion required depends on the approach you have taken and the size of audience you are aiming to reach. • If you've been interacting with potential participants through the project development process, then you have already started to promote the project.
Provide quick feedback	• Thank participants for taking part as this not only shows that they are valued, but encourages their continued involvement and gives them a sense of achievement.

Analysis and reporting phase

Plan and complete data analysis and interpretation	Consider: • Data cleaning - It is inevitable that the data will need to be cleaned • Statistical analysis - This will depend entirely upon the type of data collected • Data quality assessment - Clearly stating the quality of your data is likely to increase its use • Interpretation - Compare the results to your hypotheses or project aims.
Report results	• You will almost certainly need to report and present your results to different people: your participants, data users, funders or media. • Different levels of detail and different types of visual representation of the data will be required for the different audiences you are aiming at.
Share data	• Where possible make your data available to other researchers to maximise its use.
Evaluate to maximise lessons learned	• Evaluation is an ongoing process through which you can improve your project. • Evaluation will help you to improve your citizen science, both in terms of the data collected and analysed, and in terms of the experiences of your participants. • It can help you determine strengths and weaknesses, gather evidence of success, understand your participants' needs, improve your project, and apply for funding.