

Can plants in school have a positive effect on staff and student's learning and wellbeing?

1. Project overview

Through this project students will be able to investigate the psychological and physiological effects indoor planting may have on student and staff wellbeing. They will discover and gain a greater understanding about plant growth and care, learning about optimal growth conditions and the effects plants have on the environment around them. Working with their STEM partner, the students will be able to explore different planting options to help improve the wellbeing of those within the school, evaluating a variety of solutions and communicating their findings with the wider school community. Linking strongly to the curriculum, this project will enable teachers to inspire the next generation of urban designers. Details of the investigative work required to support this project can be found in section 4.

Duration of project
2 terms minimum to allow for plant growth times. Easily repeatable year-on-year
Can be considered as part of the Tomorrow's Climate scientists programme

2. Student involvement

This project is aimed at primary school students aged between 7 – 11, however, it could be adapted to suit other age groups and abilities. This project can be adapted to suit large groups, from clubs to whole year groups or larger, and we encourage projects to be as inclusive as possible. The project can be used to engage a wide variety of students in the school. For example:

- 1) older students mentoring younger years to engage with the observation and monitoring sections of the investigation
- 2) students with an interest in art and design helping to communicate the findings of the project to the wider school community via media such as video, posters etc.
- 3) students with an interest in design helping to build the different plant pots/growing areas to help find optimal growing conditions.

3. STEM partner involvement

Funding will only be offered to schools that can demonstrate a strong partnership. The partnership can either be with one individual STEM partner or a team of STEM partners. If there is a team of STEM partners, one must be identified as the lead STEM partner for the application process and must have sustained and meaningful engagement (in-person or online) with the students and teacher throughout the duration of the project. Other STEM partners in the team can support the project, if needed, to provide specialist knowledge or to help spread the time commitment and ensure the students have regular STEM partner engagement. For a two-term project such as described here, we would expect a **minimum of 7 in-person visits over the course of the project**, undertaken by any of the STEM partners involved. The STEM partner(s) will provide the students with relevant guidance and knowledge to help them with their investigations, as well as an insight into potential careers.

The main role of the STEM partner(s) is to support the planning, design and implementation of the investigation that the students will carry out. Examples of how the STEM partner(s) could support the implementation of the investigations include (but are not limited to):

- supporting students to form their own hypotheses
- supporting students to set up their investigations following the scientific method

- helping provide secondary research sources and support the understanding of technical information
- helping with data collection and identification
- helping the development and implementation of student plans to locate and manage plants / monitor effect on student and staff wellbeing
- helping with any building or design elements

Other activities that the STEM partner could get involved with are:

- arranging a visit to their place of work
- providing an introductory talk to the project group, or whole school, regarding their career and the relevance of this to the project being undertaken
- supporting the students end of project presentations.

Examples of STEM partners that could support this project are university or industry-based researchers, with a degree or equivalent background in a subject such as architecture (with a specialism in organic elements), ecology, botany, psychology. Professionals who are working in urban design and policy or wellbeing and health related roles.

For more information about the STEM partner eligibility requirements and guidance on how to find a STEM partner, please read the [What is the partnership](#) page on our website.

4. Investigation options

The following investigations described in the plan below will underpin this project and help the students answer the project title question. Please note some of the investigations may need to take place in parallel rather than sequentially throughout the year. The individual investigations suggested may need to be adapted or altered, dependant on the school facilities and space available. Teachers can also add in additional investigations and other project elements as required.

Project plan	Equipment suggestions
<p>Initial survey: Assess and identify the best areas of the school to trial planting interventions using visual observations and staff / student surveys to assess psychological requirements. Considerations should include; space, function of areas and levels of use.</p>	<p>Digital cameras to assess areas use.</p>
<p>Secondary research: Carry out secondary research into suitable house plants and growing conditions considering cost, size, toxicity, ease of care and properties such as colour or smell etc.</p> <p>Review pre-existing research on the impacts of indoor plants on wellbeing, as well as understanding any key variables to be used to determine the effectiveness of the planting interventions (ie air pollution effects on wellbeing, effects of colour on mood, how stress can be exhibited and identified).</p>	

<p>Baseline data collection: Collect baseline data within the chosen areas to help analyse the physiological impact of the planting interventions over time.</p> <p>Variables to consider could include; air quality, air pollution levels, temperature, humidity, students pulse rate, blood pressure and self-reported concentration levels.</p>	<p>Wi-Fi enabled air monitors (CO2 or particulate), temperature and humidity gauge – iPad of software to link with if needed Pulse oximeter Blood pressure monitors</p>
<p>Main Investigation:</p> <ol style="list-style-type: none"> Using information from the initial survey and secondary research, design a basic planting intervention that can be tested simultaneously in all of the areas identified. Make predictions on what might be observed before repeating the data collection (baseline and initial survey) to see if the evidence confirms or disproves their predictions Monitor the growth and health of the plants and explore if any care or environmental factors can be changed to help reach optimal growing conditions, and if the health of the plants has any effect on the wellbeing of staff and students. Make predictions on what might be observed before repeating the data collection (baseline and initial survey) to see if the evidence confirms or disproves their predictions Explore different growing systems (for example hydroponics systems, climbers/wall mounted and potted plants) to see if the growing conditions has any impact on the growth of plants and on the wellbeing of staff and students. Make predictions on what might be observed before repeating the data collection (baseline and initial survey) to see if the evidence confirms or disproves their predictions Based on the results of the previous investigations, propose different plant combinations that could be used and investigate to see if these have any impact on the wellbeing of staff and students. Make predictions on what might be observed before repeating the data collection (baseline and initial survey) to see if the evidence confirms or disproves their prediction 	<p>Seeds or plant plugs Compost/soil Watering systems Basic planting tools, gloves and pots. Water butt (optional)</p> <p>Different soils, pots or watering systems. Light meter / growth lights</p> <p>Hydroponics growing kit (extra plants / nutrients) Climbing plant systems, or wall mounted growers</p> <p>You may need to consider shelving or potting equipment (if not already available in school)</p>
<p>Wider communication: Communicate the results to the wider school community; methods could include information leaflets/posters, school assemblies, getting other years practically involved in the project, or a short film.</p>	<p>Please note: additional film grants towards a camera / software / microphones etc. are available to grant holders.</p>

A suggestion of essential equipment and supplies needed to undertake each of the parts of the project has been listed to assist you when putting together your budget. Please also consider any relevant additional costs permitted within the scheme, such as teacher cover, essential teacher CPD and/or travel costs for project related visits. For more guidance please read the [eligibility and judging criteria](#) page on our website.

5. Benefits and skills

Involvement in a long term investigative project should enable students to have an in-depth experience of working scientifically as well as developing their general team working and communication skills.

Through this project the students will specifically learn about the requirements of plants for life and growth and how they vary from plant to plant, gaining detailed knowledge about a specific set of plants and growing systems (such as soil and hydroponics systems) as well as a broader understanding of the psychological and physiological effects of our environment and our general wellbeing. They will learn skills in research, surveying, observation and monitoring, identification, data capture, data analysis and problem solving. Dependant on the exact investigations and activities you propose to undertake, there may be additional benefits and skills you can identify in your application.

6. Legacy activities

It is important that Partnership Grant projects are sustainable, providing long-term benefits to your students and wider school community in terms of the teaching and learning of STEM subjects.

Your legacy activities could include (but are not limited to):

- repeating the project with successive year groups
- re-using the equipment to investigate other plant species or to gather evidence on the long-term impact of the student's planting interventions over the seasons
- comparing the growth and impact of indoor plants to those located outside
- expanding the project to include other schools in the area, loaning out the monitoring equipment to collate more evidence to compare with your own.

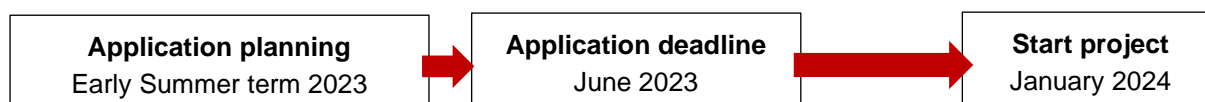
7. Next steps

1 - Securing your STEM partner

Using the information about STEM partners above, search for universities and businesses within reasonable travelling distance to you that might have suitable contacts to approach. A good route to finding these contacts is often your own school's Governors and student's parents, another is the national [STEM Ambassador](#) scheme. Once you have a few contacts in mind, write an email/letter inviting them to be involved in the project, providing clear and concise information about areas you need support with, the time commitment you are expecting, and the duration of the project. If you need further advice as to how to find a STEM partner, please contact the Schools Engagement team directly via education@royalsociety.org.

2 - How to start an application

This project is ideally started in the spring term to allow the project to run 2 terms during peak growing times year. To get the funding secured and paid in time, you will need to submit the full grant application for the June deadline in the academic year before. An example timeline is given below, and more information about [The application process](#) and timelines can be found on our website.



You can access the application form via the Royal Society's grant management system called Flexi Grant: <https://grants.royalsociety.org/>. When you first create your log-in and access Flexi Grant several grants will be visible on the screen. Please make sure you choose the **Partnership Grants stage 1** form to start.

3 - Where to get more information

You can find full information about the Partnership Grants scheme, including eligibility and judging criteria, application guidance and exemplar forms via our website: www.royalsociety.org/partnership

If you have specific questions about your project idea, STEM partner or application, please either attend one of our [online training sessions](#) or please contact the Schools Engagement team directly via education@royalsociety.org .