

How accurately can we measure local weather and how has it changed over the past 5-10 years?

1. Project overview

Through this project students will be able to investigate how to measure and better understand their local weather. They will gain a greater understanding of specific weather vocabulary as well as how to collect and analyse data for patterns and trends. Working with their STEM partner, the students will be able to explore what their local weather data can tell them about local weather conditions, the accuracy of forecasting weather and what can influence this. They will also be able to compare with historical data to see how their local climate has changed over time, communicating their findings with the wider school community. Linking strongly to the curriculum, this project will enable teachers to inspire the next generation of meteorologists. Details of the investigative work required to support this project can be found in section 4.

Duration of project
2 terms minimum to cover seasonal variation. 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 history researching old records.

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 measure and compare weather conditions
- 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; and
- 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 meteorology, environmental engineering, geophysics, and climate modelling. Professionals who are working in engineering and environmental consultancy, flood and coastal management, weather presenter, or for the Environment Agency or Met office.

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 grounds and location. Teachers can also add in additional investigations and other project elements as required.

Project plan	Equipment suggestions
<p>Initial survey: Explore what ‘weather’ is and how it is reported to the public (looking at the meaning of popular phrases and symbols used in forecasting)</p>	Printed weather symbols
<p>Baseline data collection: Investigate simple weather patterns in the local areas by conducting a survey of weather features such as cloud patterns, sunshine hours and temperature. Consider how best to take regular and accurate readings (variables to consider include: time(s) of day, direction facing, wind chill, air temperature/vs temperature in sun, clear identification of clouds etc). Analyse the data to see if any patterns can be identified, and what might be causing them.</p>	External thermometer Light meter Anemometer
<p>Secondary research:</p>	

<p>Using the baseline and initial survey data, conduct secondary research into how to locate weather stations to propose the best location(s) for your weather station(s) to ensure you get the most accurate data.</p>	
<p>Main Investigation:</p> <ol style="list-style-type: none"> 1. Record weather measurements for the local areas and compare the readings against the local forecast. Are the school recorded results more or less accurate for the local area than the local weather forecast, and can any deviations be explained? 2. Decide on the key weather observations you wish to record (temperature, wind speed, wind direction, rainfall etc) and start building a database of weather events over time (using previous data collected as well as new observations). Analyse the data for observable patterns/trends and propose a hypothesis for the cause of any identified. Keep recording the data and see if this helps to prove or disprove the hypotheses. (Note: the longer you can run the project the better this investigative element will be). 3. Locate a second weather monitoring system away from the school grounds in a different terrain (ie country vs urban, coastal vs in-land, sea level compared to high altitude, sheltered vs more open). Predict what differences might be seen in the data collected. Record data in both sights and compare readings to see if any hypotheses are confirmed or disproved. 4. Find weather records for your school area over the past 5-10 years and compare the historical data to that collected at the school. Explore any similarities, trends or changes in the data over time and propose explanations as to why changes might have occurred Common variables explored are: average temperatures for the year or month, the date of key seasonal changes/markers, frequency and timing of specific weather events (thunder storms, flooding event, high winds). 	<p>Wi-fi enabled weather station including fixings or installation costs Software/laptop(s) to capture data Items to create purpose build weather station (optional)</p> <p>Second weather monitoring system and mounting.</p> <p>Subscription costs to access historical weather data (if required)</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 measuring and predicting weather patterns in a real-world context, gaining detailed knowledge about their local weather patterns as well as a broader understanding of what affects the weather and forecasting, especially across locations and time. They will learn skills in research, observation and monitoring, data capture, data analysis, pattern recognition 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 monitor and identify other weather observations not included first time round (humidity, air pressure etc) to learn about more areas of weather measurement and forecasting
- testing out new equipment set ups to monitor the weather (rather than using pre-built weather stations)
- expanding the project to include other schools in the area, loaning out the weather monitoring equipment to collate more data to compare with your own – especially from very varied locations.

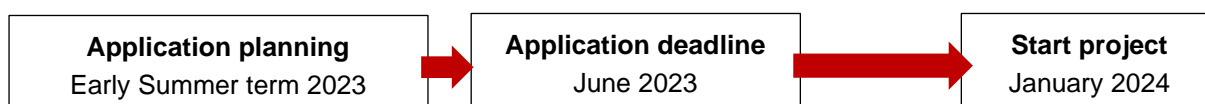
7. Next steps

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 at least two terms across strong seasonal changes. 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 .