



Rooibos in Space STEM Programme

Programme overview and implementation guide

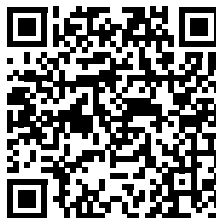
Purpose of this guide

This guide gives educators a practical overview of the Rooibos in Space STEM Programme and explains how the programme is implemented at school level. It is designed for educators and facilitators who may not be space, engineering, coding or data specialists, and who need a clear, step-by-step way to support learners through the programme.

The programme uses space as a powerful context for learning. Learners explore how the Sun, Earth, atmosphere, water, soil and plants interact, then use Rooibos in Space kits to collect real data, analyse patterns and make evidence-based conclusions. The Cederberg and rooibos-growing context makes the learning locally meaningful while linking learners to the global space sector, smart agriculture, environmental monitoring and future careers.

The guide should be read together with the educator guide, learner workbooks, assessment support pack, safety guidance, consent templates and experiment modules supplied in the educator support pack.

This QR code links to the online information and document repository:



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1 Programme purpose

The Rooibos in Space STEM Programme gives learners an authentic, hands-on introduction to space-enabled science, coding, sensor-based data collection and smart agriculture. The programme is not only about learning facts about space - it is about using space, data and technology to understand real problems on Earth.

The programme aims to:

- Build learner curiosity about space, Earth systems, technology and agriculture.
- Strengthen practical STEM skills through experiments using real sensors and real data.
- Introduce coding and connected devices in a teacher-friendly and learner-friendly way.
- Help learners understand how environmental conditions affect people, plants and food systems.
- Connect classroom learning to rooibos, the Cederberg, climate, sustainability and future careers.
- Build educator confidence in facilitating practical STEM, even where resources are limited.

2 The Year 1 focus

Year 1 focuses on foundations, kit confidence and practical investigations. The main learning areas are:

- Space and Earth systems: understanding that we live in space on a planet, the role of the Sun, Earth rotation, seasons, the atmosphere and why these matter.
- STEM essentials: using the scientific method, engineering method, data collection, data analysis and interpretation.
- Technology and coding: using the Rooibos in Space kit, understanding input, processor, output and power, working with block-based coding, and connecting through WiFi and Bluetooth where available.
- Rooibos in Space experiment modules: investigating sunlight and air temperature, air temperature and humidity, and soil moisture monitoring and control.

The seeds-in-space theme is a valuable future extension. It can be introduced as inspiration and context during Year 1, while the Year 1 implementation remains focused on educator confidence, learner participation, kit use, data collection and the three core experiment modules.

3 What educators and schools will receive

The educator support pack is intended to make implementation practical, consistent and easy to manage. Schools will receive the following programme resources and support materials.

3.1 Programme pack for educators and learners

- This programme overview and implementation guide, explaining how the project runs, the roles involved and the practical implementation sequence.
- Safety and good practice guidance for classroom, after-school and practical experiments.
- Parent or guardian information and consent templates, including participation consent and consent relating to photos, video and publication where relevant.

3.2 Learning and teaching materials, experiments

The learning and teaching materials support the programme flow and are designed for educators who need accessible, practical explanations. Each experiment module includes lesson notes, a learner worksheet, a data sheet, analysis prompts and an assessment rubric.

The three core experiment modules are:

- Sunlight and air temperature: properties of natural light, solar energy and simple investigations.
- Air temperature and humidity: comfort levels and implications for people and rooibos plants.
- Soil moisture monitoring and control: optimal growth concepts and a Bluetooth soil moisture sensing solution.

All three topics include:

- STEM essentials, including the scientific method, the engineering method and data analysis.
- Technology, including components and systems thinking, block-based coding, WiFi and Bluetooth connections, data collection, data display, Internet of Things and remote sensing foundations.

3.3 Digital tools and AI-enabled content support

Educators will receive support for using digital tools and AI-enabled content creation responsibly. This includes:

- Block-based coding examples and libraries.
- Digital dashboards and 3D design tool
- Access to the Rooibos in Space AI Educator Assistant.
- Guidance on adapting lessons, generating worksheets, differentiating by grade and creating assessments.
- Ready-to-use prompts and practical examples for educators.
- Guidance on responsible AI use, including accuracy checks, learner safeguarding and citations where needed.

3.4 Educator development and delivery support

Educators will be supported through:

- An educator onboarding session covering programme orientation and kit confidence.
- Educator training on the three main learning topics and experiment modules.
- Structured practical touchpoints during implementation for guidance and troubleshooting.

3.5 Evidence, recognition and reporting support

Schools will receive practical support to capture and share programme evidence. This includes:

- Guides for photo and video evidence, learner reflections and experiment logs.
- Simple reporting templates to capture outputs and outcomes for school and sponsor reporting.
- End-of-cycle showcase support, including a poster template, short pitch template and data-storytelling guidance.

4 Programme principles

The programme is built on a few practical principles.

First, learners learn by doing. Every learner should have the opportunity to touch the equipment, ask questions, collect data, analyse results and explain what they have found.

Second, educators do not need to be subject experts before they begin. The educator's role is to facilitate curiosity, guide safe practice, help learners follow a process and encourage evidence-based thinking.

Third, real data matters. The programme is designed around sensor-based measurements, observations, graphs, simple calculations and learner interpretation. Learners should see that science and engineering are practical ways of understanding the world.

Fourth, the learning should be inclusive. Schools should organise learner participation in a way that gives as many learners as possible access to the programme. Learners can work in pairs or small teams where kit numbers are limited.

Fifth, the programme connects local and global relevance. Rooibos, soil, climate, water, agriculture and the Cederberg give the programme a strong local foundation. Space, satellites, remote sensing, IoT and the International Space Station connect learners to global opportunities.

5 How the programme runs

Each participating school should nominate a Programme Lead educator. This educator does not need to do everything alone. The Programme Lead coordinates the school-level implementation and works with a support educator, school leadership and the implementation team.

Phase 1: School readiness and educator onboarding

The school confirms its Programme Lead educator, support educator, learner participation plan, equipment storage arrangement and preferred delivery timetable. Educators attend onboarding and become familiar with the kit, the support pack and the programme expectations.

Phase 2: Learner orientation

Learners are introduced to the Rooibos in Space story, the Cederberg and rooibos context, why space matters on Earth, and how the programme will run. This phase should build excitement and confidence. It should also introduce safe handling of equipment and respectful teamwork.

Phase 3: Foundation learning

Learners complete the foundation topics: space and Earth systems, STEM essentials, systems thinking, components, coding basics and data interpretation. Educators can deliver these as short sessions before the experiment modules or combine them with practical activities.

Phase 4: Practical experiment modules

Learners complete the three core modules: sunlight and air temperature, air temperature and humidity, and soil moisture monitoring and control. Each module should include planning, data collection, recording, analysis, interpretation and reflection.

Phase 5: Evidence, showcase and reflection

Learners prepare a simple output that explains what they investigated, what data they collected, what they found and why it matters. Outputs may include posters, short presentations, learner workbook pages, data charts, photographs, videos, experiment logs or data stories.

6 Suggested delivery model

Schools may deliver the programme in different ways depending on timetable, educator availability and learner numbers. The recommended model is one regular session per week, ideally one hour per session, with additional time for longer experiments where needed.

A practical delivery approach is:

- Run the programme as an after-school club, enrichment programme, STEM club, science club or technology activity.
- Work with learner teams of two to four learners, depending on the number of kits available.
- Use short educator explanations followed by practical activity.
- Keep a simple session register and evidence log.
- End every session with a short reflection: what did we do, what did we observe, what did the data show, and what do we need to do next.

Where internet connectivity is available, learners should connect to WiFi and use online data tools where appropriate. Where connectivity is limited, educators can still run practical activities using local kit readings, recorded observations, learner worksheets and later data entry where needed.

7 Safety and good practice

A comprehensive document is provided covering all aspects of safety and good practice. All practical work must be safe, supervised and manageable. Educators should use the safety and good practice guidance supplied in the support pack.

8 Assessment approach

Assessment should support learning. The purpose is not only to mark a final answer. Learners should be recognised for following a scientific process, working safely, collecting data carefully, thinking critically and explaining their conclusions.

Educators are encouraged to use short formative assessments throughout the programme. Examples include exit questions, learner reflections, workbook checks, peer discussion, practical demonstrations and short presentations.

9 Evidence and reporting

Evidence helps the school, learners, educators and sponsors understand what has been achieved. It also helps the implementation team improve the programme.

Evidence may include:

- Attendance registers or learner participation logs.
- Completed learner workbook pages.
- Experiment planning sheets.
- Data sheets and graphs.
- Photos or videos of learners working, where consent is in place.
- Learner reflections.
- Educator reflections.
- Showcase posters or presentations.

Schools should keep evidence simple and practical. A small amount of good quality evidence is more useful than a large collection of unsorted material. The reporting templates supplied in the pack will guide schools on what to submit and when to submit it.

10 Parent or guardian consent

Schools must obtain the required parent or guardian consent before learners participate. Consent templates will be supplied. These templates may include consent for participation, safe practical activities, photographs, video, publication of learner activities, showcase participation and programme reporting where relevant.

Educators should ensure that learner dignity and safeguarding are protected at all times. Learners who do not have photo or video consent should still be able to participate fully in learning activities. The school should manage consent information carefully and ensure that only approved media is shared.

11 End-of-cycle showcase

The end-of-cycle showcase gives learners the opportunity to explain their work and celebrate what they have learned. It also helps the school demonstrate the value of the programme to parents, the community and programme partners.

The strongest showcase outputs explain why the investigation matters. Learners should be encouraged to connect their results to rooibos, plant health, water use, climate, human comfort, smart farming or future careers.

12 What success looks like

A successful implementation is not defined only by perfect experiments. It is defined by active learner participation, educator confidence, safe practical activity, useful data, thoughtful learner interpretation and evidence that learners are connecting science, technology and agriculture to the real world. By the end of the programme, learners should be able to:

- Explain that Earth is a planet in space and that the Sun drives many systems on Earth.
- Describe how environmental conditions such as light, temperature, humidity and soil moisture can affect people and plants.
- Identify patterns in data and make simple evidence-based conclusions.
- Explain how technology can support agriculture, sustainability and decision-making.

13 Final message to educators

The Rooibos in Space STEM Programme is designed to be practical, inspiring and achievable. The educator's most important role is to create a safe environment where learners can explore, test, measure, ask questions, make mistakes, improve their thinking and explain what they discover. This programme gives learners a way to see that space is not distant from their lives. It connects directly to sunlight, soil, water, plants, weather, data, technology, agriculture and the future economy. Through this work, learners can begin to see themselves as scientists, coders, engineers, data analysts, farmers, entrepreneurs and problem-solvers who can contribute to South Africa's future.