TLOTLEGO SMILES FOUNDATION SCIENCE & INNOVATION FAIR

COMPREHENSIVE LEARNER PROJECT GUIDEBOOK

DISCOVER. CREATE. INVESTIGATE. INNOVATE.

SECTION 1: UNDERSTANDING RESEARCH & INNOVATION

What is Scientific Research?

Scientific research is a structured way of asking questions and finding answers through investigation, observation, experimentation, and evidence.

Good researchers:

- Ask meaningful questions
- Investigate carefully
- Record evidence
- Analyse results
- Draw conclusions
- Share discoveries

Research helps learners become:

- Critical thinkers
- Problem-solvers
- Innovators
- Future scientists and entrepreneurs

SECTION 2: THE RESEARCH PROCESS (DEEP GUIDE)

STEP 1: IDENTIFY A REAL PROBLEM

Strong projects usually solve real problems.

Ask:

Home Problems

- How can water be saved?
- How can food stay fresh longer?
- How can electricity be used more efficiently?

School Problems

- What affects learner concentration?
- Can classroom air quality affect learning?
- How can waste be reduced at school?

Community Problems

- Water shortages
- Dust pollution
- Waste management
- Renewable energy
- Road safety
- Nutrition

STEP 2: DEVELOP A RESEARCH QUESTION

Your question should be:

Clear

Avoid vague questions.

Bad:
“Is pollution bad?”

Better:
“How does dust from mining activities affect plant growth in Kuruman?”

Specific

Bad:
“How can learners study better?”

Better:
“Does studying with music improve memory retention among Grade 9 learners?”

Measurable

You must be able to collect evidence.

STEP 3: LITERATURE REVIEW (BACKGROUND RESEARCH)

Before starting your project, research what others already know.

Use:

- School textbooks
- Library books
- Academic journals
- Government websites
- University research
- Google Scholar
- Scientific magazines

Research helps you:

- Understand your topic
- Avoid repeating old studies
- Identify gaps
- Improve your project idea

STEP 4: FORM A HYPOTHESIS

A hypothesis is your prediction.

Example:

“If greywater is filtered through charcoal and sand, then water quality will improve.”

Good hypotheses are:

- Testable
- Logical
- Specific

STEP 5: DESIGN YOUR METHOD

Your method explains exactly how you will conduct your research.

Include:

Materials

Example:

- Measuring cups
- Soil samples
- Plants
- Thermometer
- Stopwatch

Procedure

Number every step.

Example:

1. Collect three soil samples.
2. Plant identical seeds.
3. Water daily.
4. Measure growth for 21 days.
5. Record data.

Variables

Independent Variable

What you change.

Dependent Variable

What you measure.

Controlled Variables

What stays the same.

STEP 6: COLLECT DATA

Good data can be:

Quantitative

Numbers:

- Height
- Temperature
- Time
- Percentages

Use:

- Tables
- Charts
- Photos
- Graphs

Qualitative

Descriptions:

- Colour changes
- Smells
- Observations

STEP 7: ANALYSE YOUR RESULTS

Ask:

- What patterns do I see?
- Did my hypothesis prove correct?
- What surprised me?
- What could improve?

STEP 8: CONCLUSION

Your conclusion should answer:

- What did I discover?
- Why does it matter?
- How can this help others?

SECTION 3: ETHICS & RESEARCH INTEGRITY

Ethics Approval Needed If You Work With:

- Surveys/interviews
- Personal information
- Human participants
- Children
- Sensitive community data

You must:

- Get consent
- Protect privacy
- Be respectful
- Keep information confidential

SECTION 4: PROJECT BOARD DESIGN TEMPLATE

Official Project Display Board Specifications

Recommended standard tri-fold board.

Overall Size

Maximum Total Width:

240 cm (2.4 m)

Recommended Width:

180 cm

Height:

120 cm

Panel Breakdown

Left Panel:

60 cm wide × 120 cm high

Centre Panel:

120 cm wide × 120 cm high

Right Panel:

60 cm wide × 120 cm high

Poster Font Recommendations

Title:

72–100 pt

Headings:

36–44 pt

Body Text:

24–30 pt

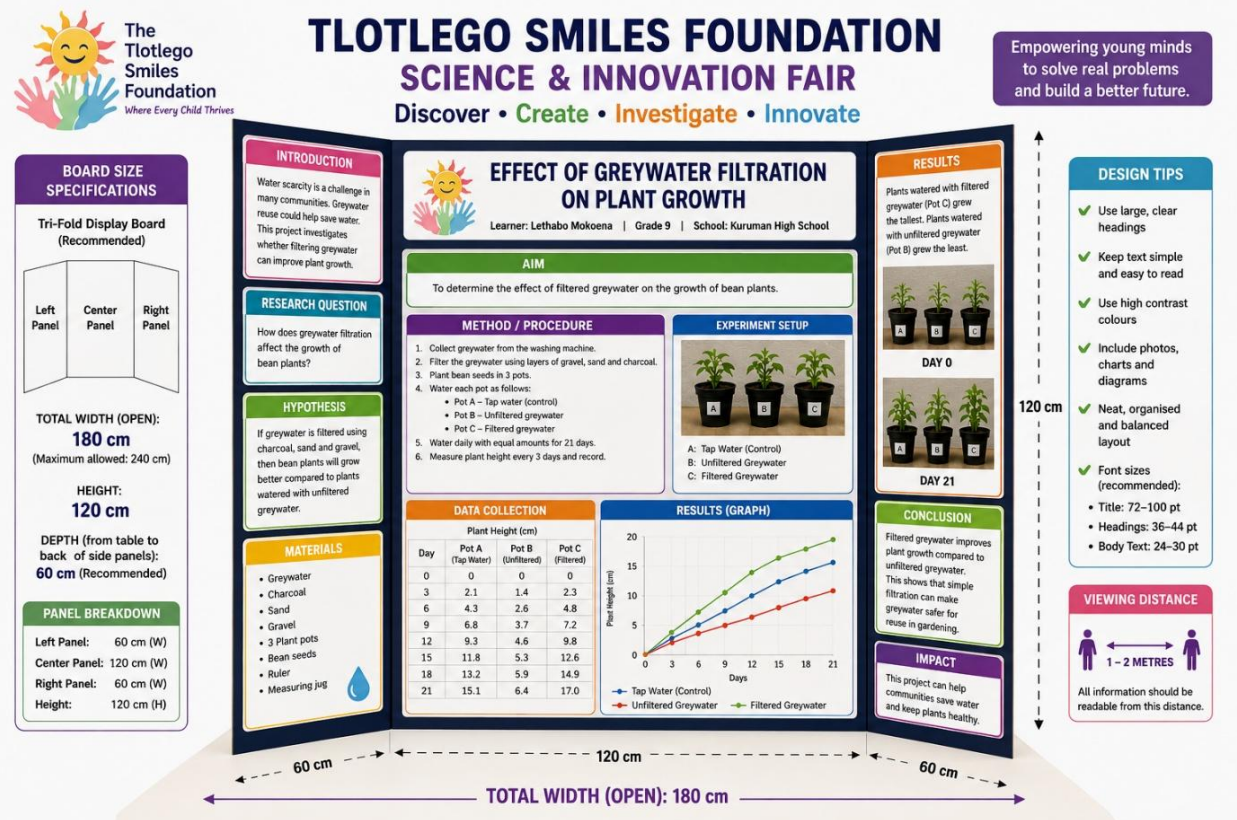
Must be readable from **1–2 metres away**.

Colour & Design Tips

Use:

✓ Clear headings
✓ Large readable text
✓ Consistent colours
✓ Photos and diagrams

PROJECT BOARD LAYOUT TEMPLATE



SECTION 5: WHAT JUDGES LOOK FOR

Scientific Quality

- Clear question
- Strong method
- Accurate data

Innovation

- Creativity
- Originality
- problem-solving

Understanding

- Can learner explain project clearly?

Presentation

- Professional board
- Neatness
- Confidence

Avoid:

✗ Too much text
✗ Small fonts
✗ Busy backgrounds
✗ Too many colours
✗ Paragraph-heavy sections

SECTION 6: PROJECT TIMELINE TEMPLATE

Week	Activity
1	Choose topic
2	Research background
3	Write research plan
4–6	Conduct experiment
7	Analyse data
8	Write report
9	Design project board
10	Practice presentation

Tlotlego Smiles Foundation Science & Innovation Fair Values

Curiosity

Ask questions.

Integrity

Be honest.

Creativity

Think differently.

Excellence

Do your best.

Community Impact

Solve real problems

Registration and Submission Process

1. Complete the online pre-registration on our website before submitting any documents.
2. By **3 August 2026**, you must submit the following documents:
    - Research Plan
    - Plagiarism Declaration Form
    - Code of Conduct Agreement
3. After completing your online registration, you will receive an email within **7 days** containing:
    - Your unique project registration number
    - Instructions on how to submit your documents
    - Important information about the Science & Innovation Fair
4. Your project board does not need to be submitted before the event. You will bring and display your project board yourself on **29 August 2026**, the day of the Science & Innovation Fair.
5. More information about the event and requirements for the day will be sent to all participants by email before the event.

Need Help?

For any questions or assistance:

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