Case 1: The STEM Taster WEEK

Helping girls discover STEM through personally meaningful problems

Context:

A youth centre noticed girls rarely signed up for its robotics and coding clubs despite equal access.

THINKING Question

Please consider: *What potential reasons could girls have for rarely signing up for robotics and coding clubs despite equal access?*

In different contexts, reasons can differ. Some common possibilities include:

- Lack of perceived relevance: they might not see how STEM connects to issues they care about.

- Limited visible role models: few female mentors, teachers, or peers in STEM.

- Confidence barriers: fear of not being "good enough" or stereotype threat.

- Social pressures: family, peers, or cultural expectations suggesting STEM is "for boys."

- Intimidation by technical skills: the clubs may seem too advanced or competitive.

- Lack of awareness of career pathways or opportunities linked to STEM skills.

- Group dynamics: feeling isolated in a mostly male environment.

What the centre did to remedy the low interest of girls in their STEM offer?

They collected insights from girls and redesigned their annual "Tech Week" to focus on specific problems students said they strongly cared about:

- Eco-friendly transport
- Community safety
- Improving public spaces
- Mental-health tech

Each workshop connected STEM skills to these real issues. Examples include:

- Eco-friendly transport: designing apps or sensors to track bike lanes, optimize public transport, or reduce carbon footprint.

- Community safety: creating sensors or apps to map safe walking routes, designing alert systems, or using data visualization for local safety issues.

- Improving public spaces: designing interactive installations, smart lighting, or environmental monitoring systems for parks and public areas.

- Mental-health tech: developing apps for stress tracking, digital journaling tools, or AI-powered reminders for self-care.

THINKING Question

Please consider: *Why could this solution work well? What elements and approaches should be included for the approach to realistically engage girls in STEM activities in the long run?*

The readjusted format of problem-based workshops and themed STEM tasters worked well as it addresses multiple factors:

- **Relevance:** STEM is tied to issues girls care about, making it meaningful.

- **Identity activation:** Hosts and mentors used identity-building language, e.g., "You're thinking like a designer/analyst here," helping participants see themselves as capable in STEM.

- **Role models:** Near-peer female mentors (successful university students in STEM) provided visible examples of success.

- **Low-stakes engagement:** Small group challenges were incorporated to reduce fear of failure and increase confidence. Examples include: building a simple sensor prototype, coding a basic safety app, or testing multiple solutions before choosing one.

- **Hands-on learning:** Practical problem-solving is more engaging than abstract coding exercises.

- **Social connection:** Working in teams fosters belonging and collaboration.

- **Reflection & growth mindset:** Guided questions help students see progress and skill development.

WHAT IS THE IMPACT OF THE INITIATIVE?

- Significant increase in girls' enrolment in the robotics club.
- Participation of female teams in a local innovation challenge — previously none.

WHY IT WORKED? It applied the **principles of relevance, identity activation, and visible role models.** Girls reported they "finally saw how STEM solved real problems."

Think:
How could you apply the model in your context?

I. Run short STEM tasters that focus on social impact or real-life problems rather than technical mastery.

How to do it?

Step 1: Collect insights from students

Use short surveys, focus groups, or informal interviews to ask girls what real-world issues matter most to them.

- Sample questions:
  - "What problems in your community would you like to solve?"
  - "What topics make you excited to learn new skills?"
  - "Are there areas where you wish technology or design could help?"

Step 2: Identify themes for the workshops

From the feedback, select 4–5 high-interest topics that can be connected to STEM skills. Examples include:

- Inclusive school or community design: making spaces accessible for all.
- Climate action or sustainability: smart recycling bins, community gardens, renewable energy projects.
- Smart city solutions: traffic management systems, public transport optimization, urban planning tools.
- Disaster preparedness and response: building apps or devices to track weather hazards, alert systems, or emergency response planning.
- Robotics and automation: designing robots or automated systems for industrial, agricultural, or everyday applications.
- Space and environmental exploration: building sensors, drones, or simulations to monitor air quality, water quality, or climate change impacts.
- Data-driven decision making: analyzing data to improve community planning, business processes, or resource management.
- Engineering challenges: designing bridges, structures, or devices that solve practical engineering problems in local communities.

- Gaming and interactive technology: developing apps or games that teach coding, logic, or problem-solving skills.
- Social good tech: apps to connect volunteers, support local charities, or improve community services.
- Health and wellbeing: monitoring fitness, nutrition, or sleep habits.
- Creative technology: combining design, coding, and storytelling for social campaigns.

Step 3: Map STEM skills to real-world problems

Examples:

- Coding & app development: building apps to track local data or provide alerts.
- Robotics & sensors: constructing devices to measure environmental factors, map safe routes, or monitor pollution.
- Data analysis & visualization: interpreting local data on traffic, safety, or sustainability.
- Design thinking & prototyping: brainstorming solutions, creating low-cost prototypes, or designing public service campaigns.

Step 4: Structure the workshops

1. Intro / Context: Present the problem, why it matters, and examples of how STEM can solve it.
2. Skill practice: Hands-on coding, robotics, or prototyping to tackle the problem.
3. Group collaboration: Teams discuss ideas and experiment with solutions.
4. Reflection & sharing: Groups present prototypes; facilitators use identity-building language:
   - "You approached this like a designer."
   - "You applied analytical thinking to solve a real challenge."

STEP 5. Add motivating elements

- Near-peer mentors: female university students or young professionals guide teams, share experiences, and provide encouragement.
- Low-stakes challenges: focus on creativity and problem-solving, not just winning.
- Recognition: micro-badges, certificates, or showcase of solutions to reinforce achievement.

II. Use identity-building language that reinforces skill and belonging:

"You're thinking like an engineer here."
"That's how an analyst approaches problems."

III. Integrate reflection prompts after each session:

"What did you discover today?"
"Which skills surprised you about yourself?"

IV.Focus on peer collaboration to create safe and supportive learning groups.

V. Adapt problems to locally meaningful issues, like community, environment, or public services.

VI.Track and celebrate progress and participation, not just outcomes, to reinforce engagement.

Remember that:

- It is important that students see direct relevance of STEM skills to issues they care about.
- Hands-on, socially meaningful projects increase engagement and confidence.
- Near-peer mentoring and reflection reinforce identity, belonging, and skill recognition.
- Low-stakes, collaborative challenges reduce fear of failure while building teamwork and problem-solving skills.