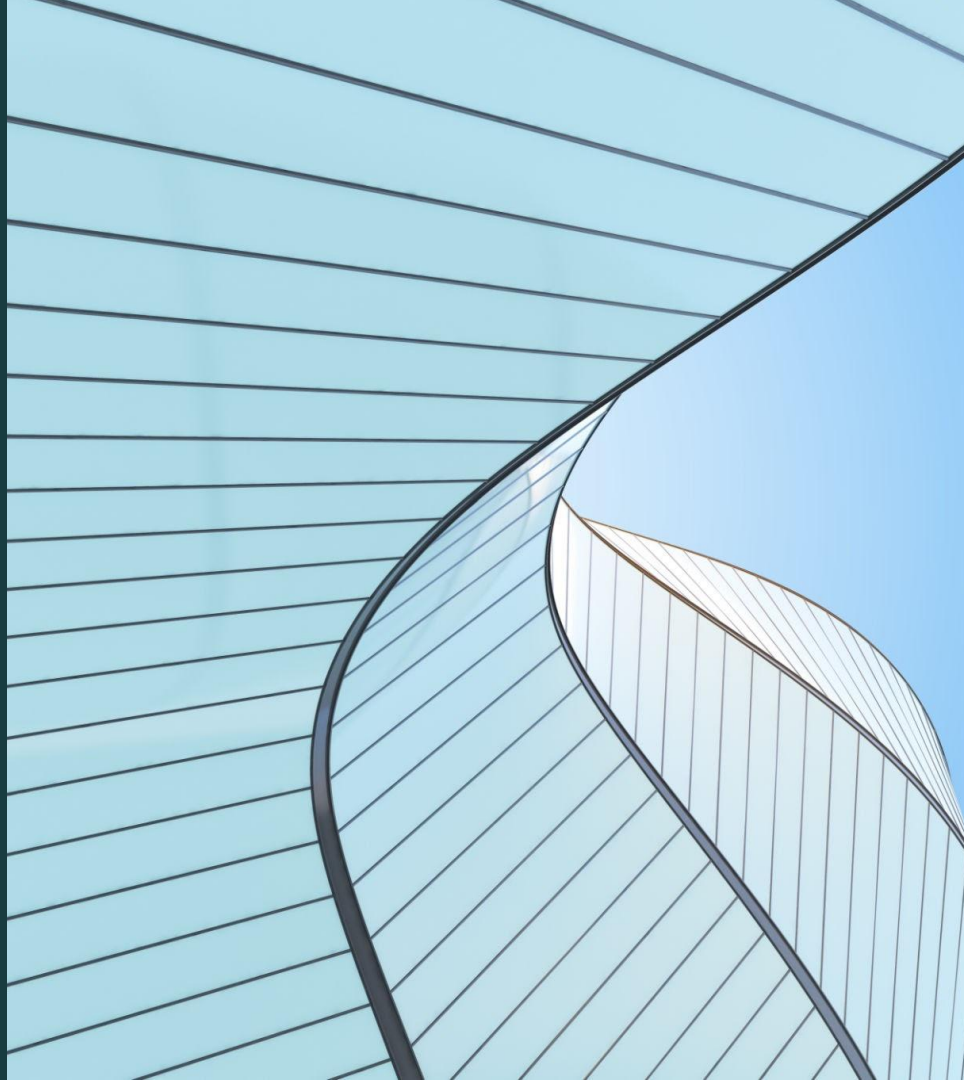
M.O.J.O.
Date 10.24.25

Open STEM Project

Team M.O.J.O. presents our solution to address the lack of inclusive, inquiry-based STEM toys in the current market.



Our *team*

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Content *overview*

01

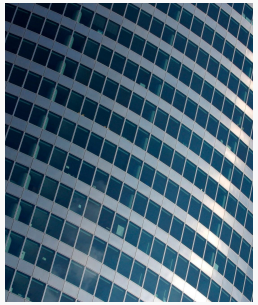
Problem Statement

The team has found that commercial offerings labeled as “girls’ STEM toys” often present narrower technical content, stereotyped themes, and uneven value relative to gender-neutral alternatives, which can dampen girls’ early interest in STEM.

This mission statement is of personal importance because we have so little women in engineering, creating a gender barrier and necessitates equaling of grounds and breaking of gender barriers.

OUR GOAL

Our goal is to design and market a gender-neutral STEM toy that offers genuine educational value and high creative possibility.



We aim to challenge the stereotypes of the current market and provide a product that fosters genuine, early interest in engineering and problem-solving for all children.

02

Background & Consumer Data

BACKGROUND DATA & CONSUMER DATA

Our own market research from October 2025 gives us clear direction. The market is primed for a new product: a significant majority, over 60% of people, believe STEM toys are vital for a child's development.

However, there's a clear disconnect. That same majority, 61.1%, feels that toys are not marketed equally, which supports our core problem statement.

We also gathered key consumer insights: 83.6% of participants had building sets as kids, showing a lasting familiarity with this type of play. And crucially, 44.2% identified affordability as a top priority, which, combined with our expert feedback on 'cost-effectiveness,' makes price point a central part of our design and business strategy.

61.1%

Of participants stated they do not believe toys are equally marketed towards boys and girls.

83.6%

Of participants who had building sets as children.

44.2%

Of participants who chose affordability as one of their top priorities.

60.8%

Of participants stated that STEM toys are highly important for a child’s development.

03

Expert Interviews

Expert Interviews

Grace Paradis
Child Development Specialist

Assistant Professor at California State University, Stanislaus

- Children don't inherently differ in STEM ability; disparities come from socialization and cultural expectations.
- Neutral or mixed-color recommended to avoid reinforcing stereotypes.
- Dual Marketing (Neutral +Girl marketing).
- Parents play a critical role in buying the product, must be safe and cost-effective.
- Suggested co-play.

Nancy Dayne
Child Development Specialist

Professor at California State University, Long Beach

- Packaging and colors strongly influence parent/child perception.
- Parents play the largest role in how kids use STEM toys.
- Not only do parents purchase the toys, but their guidance also heavily increases child engagement with the toys.
- Needs to provide authentic educational value.
- Prototype should encourage parent-child interaction and be affordable, accessible, and genuinely educational.

04

Past and Present Solutions

Goldieblox and the Spinning Machine

Pros

- Cost-effective
- Simple

Cons

- Low creativity
- Does not strongly encourage problem solving

Mega Cyborg Hand

Pros

- Uses hydraulics
- Teaches STEM very effectively
- Moderately complex

Cons

- Uses hydraulics
- Limited usage
- Limited durability
- Very expensive

05

Design Criteria & Constraints

Design Requirements and Specifications

Based on our market analysis, expert consultations, and consumer research, we've identified three critical requirements that will differentiate our product and address the gaps in the current market.

Cost-Effective

Current STEM toys create an artificial price barrier: quality educational products often exceed $50, while lower-cost alternatives around $20 sacrifice educational value—both scenarios prioritize manufacturer profit over accessibility. Our target: deliver genuine educational value at a price point that makes quality STEM learning accessible to more families.

Versatility of Play

Many STEM toys restrict children to single-use scenarios that don't justify their cost. Our design will enable play across multiple contexts and environments, supporting both independent exploration and parent-child co-play—a critical factor identified by our child development experts for sustained engagement and learning.

Durability

Industry-standard thin plastics fail within weeks of typical use, undermining both value and environmental responsibility. Our product will feature robust construction designed for extended play cycles, with easily replaceable components to extend product life and reduce waste—aligning with parent priorities for long-term value (44.2% cited affordability as top concern).

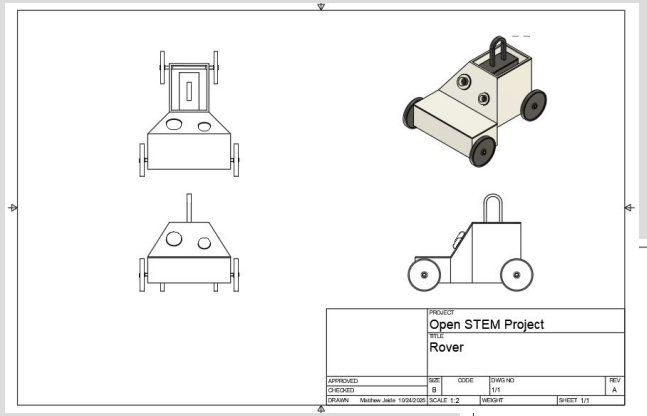
06

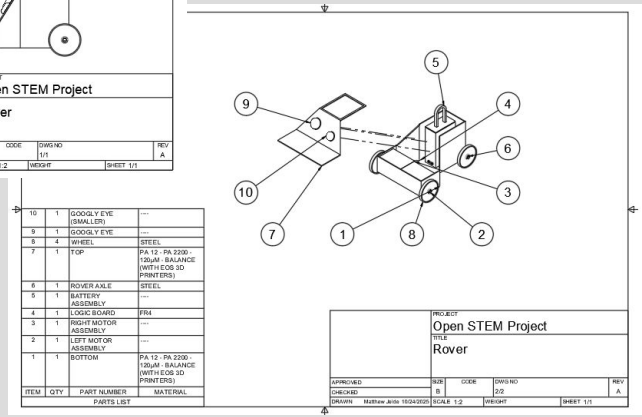
Sketches of Ideas

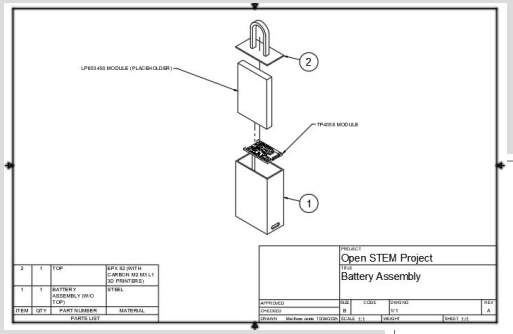
KEY ACTIVITIES

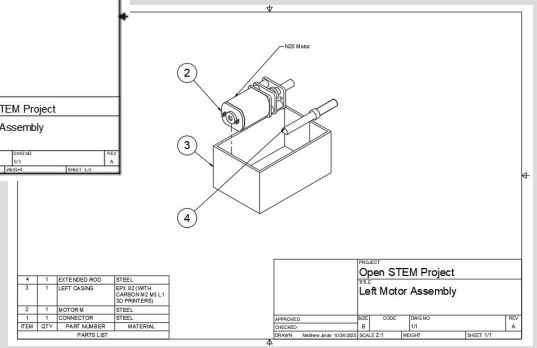
Brainstorming Solutions

We are planning to develop a modular STEM rover kit that addresses key gaps identified in our research: lack of authentic inquiry, limited co-play support, and restrictive gendered marketing in existing products.









Our modular rover design features interchangeable components—motors, sensors, brain modules, and chassis—allowing children to swap parts and immediately observe how design choices affect behavior. Our goal is for one kit to build two complete rovers, enabling racing, collaborative experimentation, and progressive challenge pathways aligned with NGSS inquiry standards.

Inclusivity, Design, and Co-play

Dual Packaging Strategy

Same product, two different packages: one gender-neutral, one marketed towards girls. Our experts explained purchase bias exists with guardians, not children. By offering both versions, we directly address the gendered marketing barrier—guardians who seek "girls' STEM toys" find our product, while those preferring neutral options have equal access to identical educational content.

Universal Design Language

Mechanics-first aesthetics avoid stereotyped themes. All learners—regardless of gender—engage with authentic engineering concepts: gear ratios, sensor logic, spatial reasoning. The product itself makes no assumptions about who belongs in STEM.

Accessible Co-Play Framework

Dual instruction sets (solo and facilitated) remove expertise barriers. Guardians from any background can support learning using provided observation prompts and challenge cards—no engineering degree required. This inclusivity extends STEM access beyond families with technical parents.

Modular Progression System

Multiple brain modules and interchangeable components allow each child to engage at their level and interest. Line-following, obstacle avoidance, or basic driving—learners choose their challenge. Progressive difficulty prevents exclusion based on prior experience or confidence.Retry

Plans for the future

November

- Complete Design Brainstorming
- Order Supplies and Materials

December

- Complete initial technology testing
- Start Building A Prototype

January

- Complete first Prototype
- Test the prototype for durability

February

- Redesign, Repair, Revamp Prototype
- Re-test Prototype

March

- Make final changes and finalize design
- Organize documentation efforts and

April

- Add finishing touches
- Present final project

May

- Possibly enter production field
- Possibly sell design/patent

Thank you