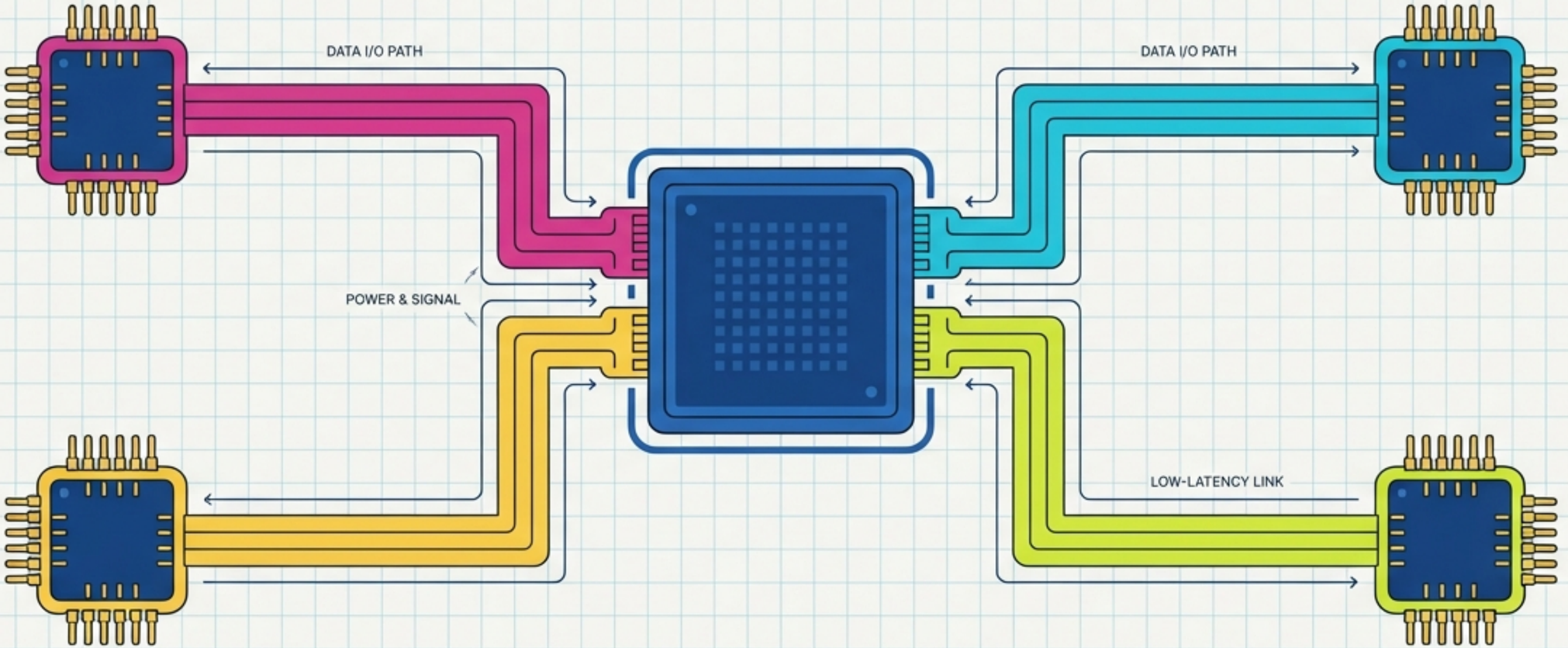
The Interactor Concept

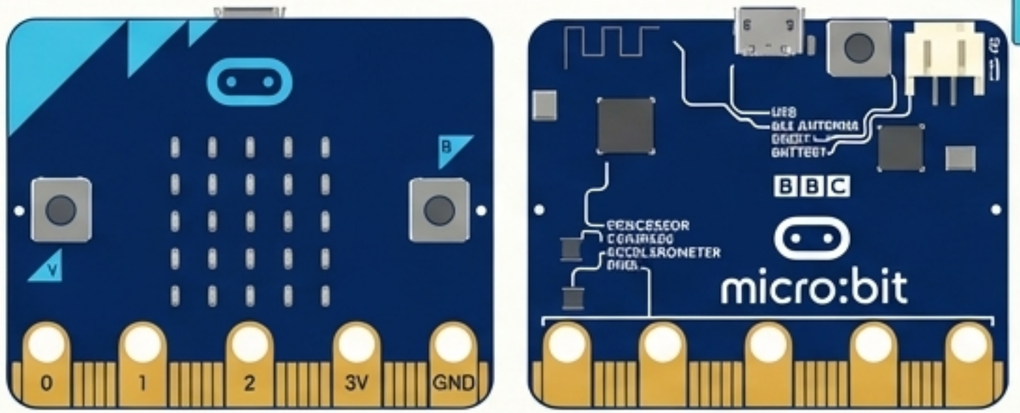
Bringing Liveness to Multiplayer Physical Computing



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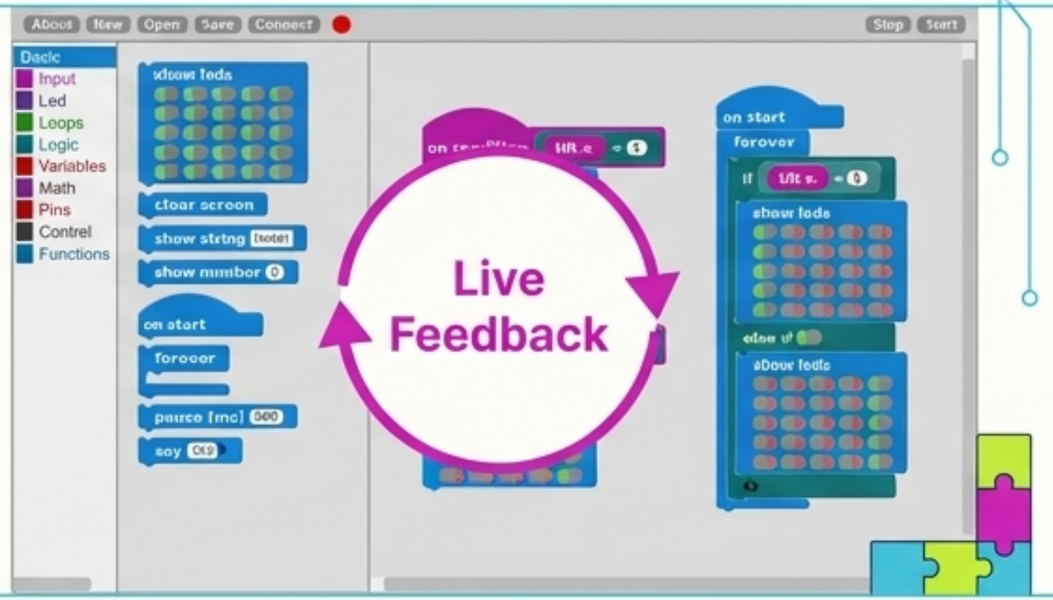
Where ideas are watered.

The Pedagogy: Equity of Opportunity



Providing foundational Curiosity Kits and Micro:bits to spark early, equitable STEM engagement across the district.

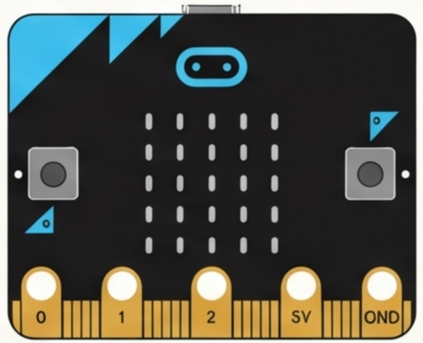
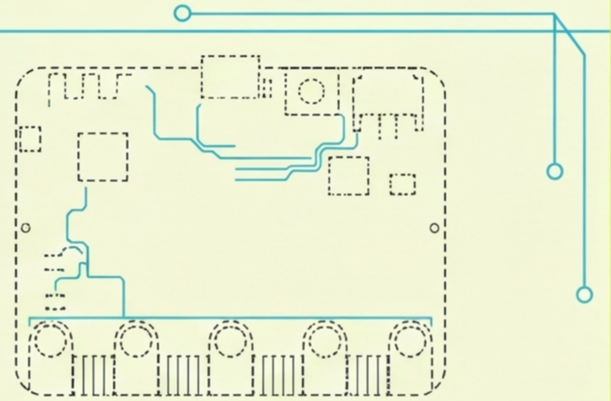
The Interface: The Power of Liveness



Proven by academic research: immediate, live feedback on physical devices drives unparalleled student engagement.

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The challenge of scaling physical interaction.

Solo Computing (Micro:bits)	**Advanced Robotics** (Comau)	**The Missing Link**
		
Liveness: High	**Liveness:** Low (Requires compilation)	**Liveness:** High
Interaction: Low (Single-player)	**Interaction:** High	**Interaction:** High
Physical Friction: Low	**Physical Friction:** High (Motors & physics obscure pure logic)	**Physical Friction:** Low

How do we get students' code to interact in a shared physical space, focusing purely on algorithmic logic without the mechanical overhead?

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A shared stage for algorithmic interaction.

> “Eventually everything connects. People, ideas, objects.”
>
> – Charles Eames



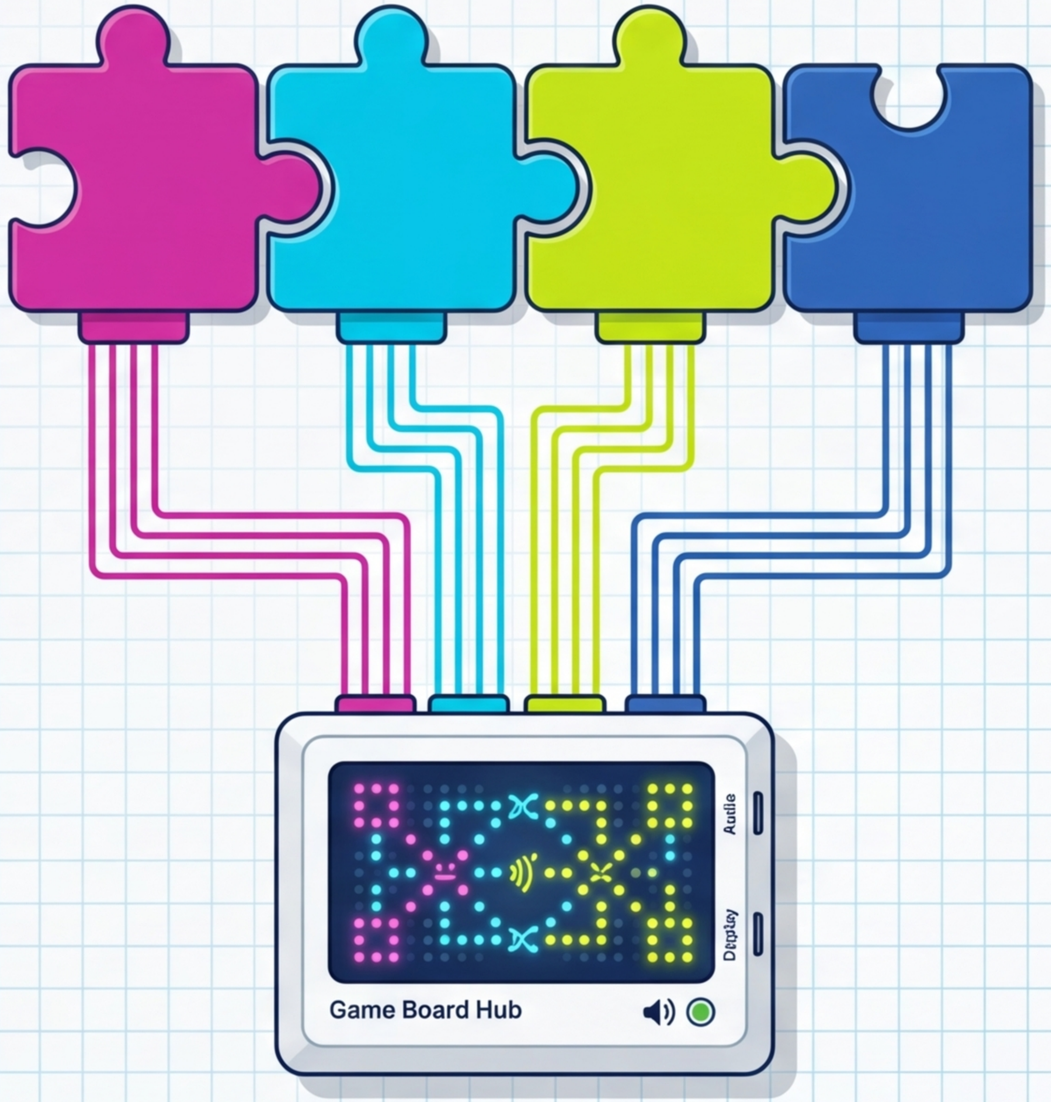
- **Physical Presentation**
  A central board with LED matrices, audio, and displays.



- **Minimized Friction**
  Removes complex physical world variables (chassis, wheels, gravity) from the learning equation.



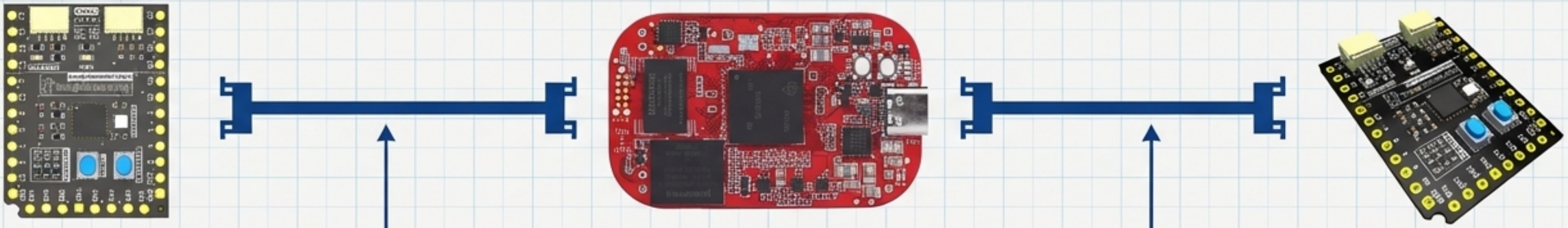
- **Code as Controller**
  Students program individual nodes to handle live conditions, interacting without joysticks or manual inputs.



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Anatomy of the Interactor.

The Hub: PocketBeagle 2
The Game Board Controller. Ultra-compact 64-bit ARM running the game state, LED matrix, and audio.



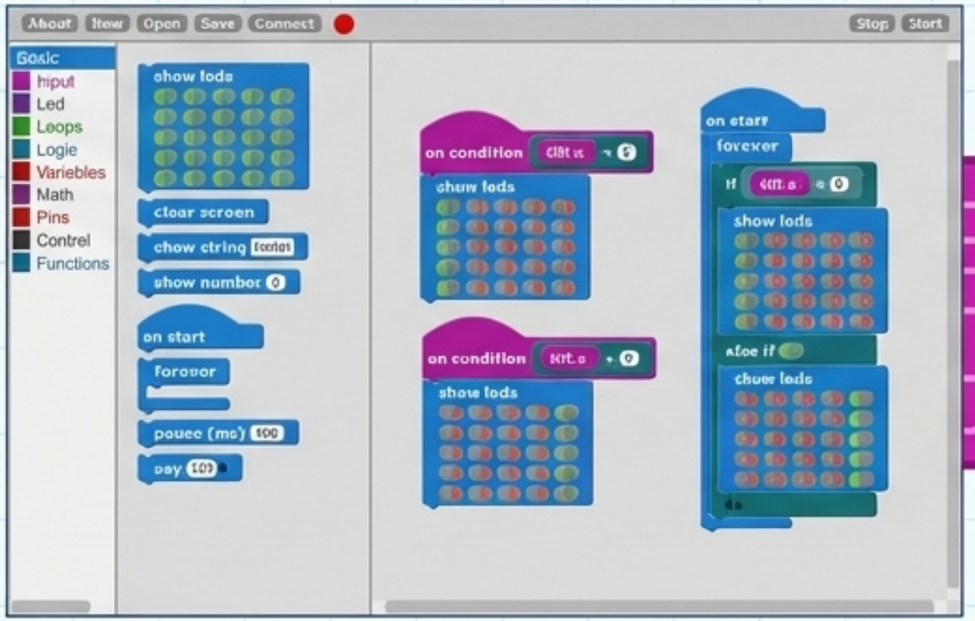
The Links: Qwiic / mikroBUS
Standardized, friction-fit connectors. Zero soldering required. True plug-and-play.

The Player Nodes: BeagleConnect Zepto
$1, stamp-sized MSPM0 microcontrollers. Every student gets their own node to program.

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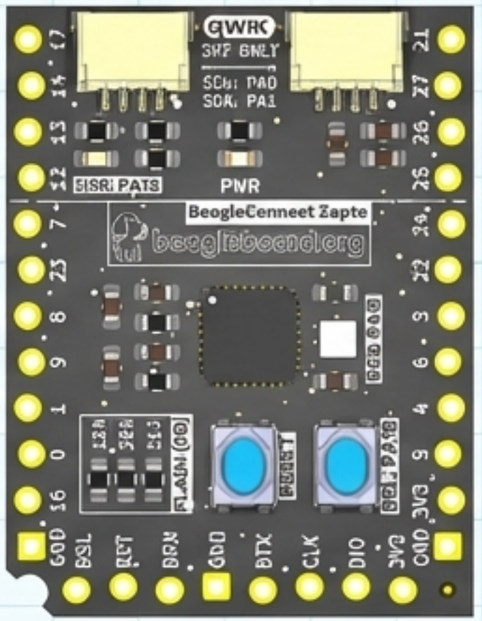
Seamless live programming with MicroBlocks.

Familiar Interface



Zero Compilation Time

Intelligent Edge Node



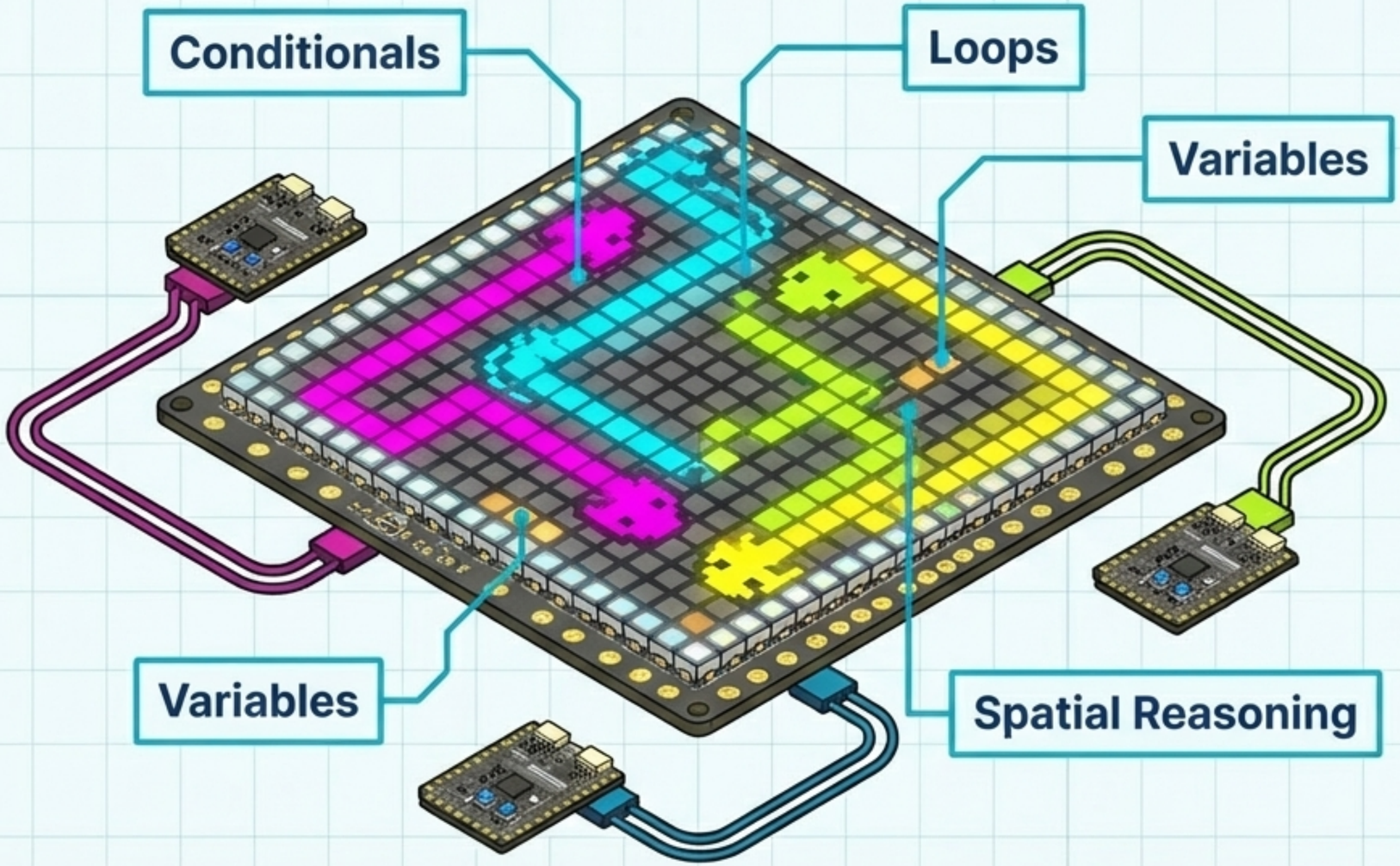
Students program their $1 Zepto nodes using the familiar MicroBlocks interface (or Python/C).

Liveness is completely preserved: students test logic locally before plugging into the main arena.

The Zepto acts as an intelligent edge node, executing conditional logic in response to the main Game Board's state.

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Mode 1: Competitive Coding (Physical Battlesnake).



The Rules of Engagement

The Setup

4 students plug their pre-programmed Zepto nodes into the board.

The Rules

Manage space, maintain health, and avoid collisions.

The Logic

No joysticks allowed. The students' code dictates movement based on live sensor data fed back from the board.

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Mode 2: Collaborative Creation.



Interactive Art

Player nodes control independent color channels, stroke styles, or physics parameters on a shared digital canvas.

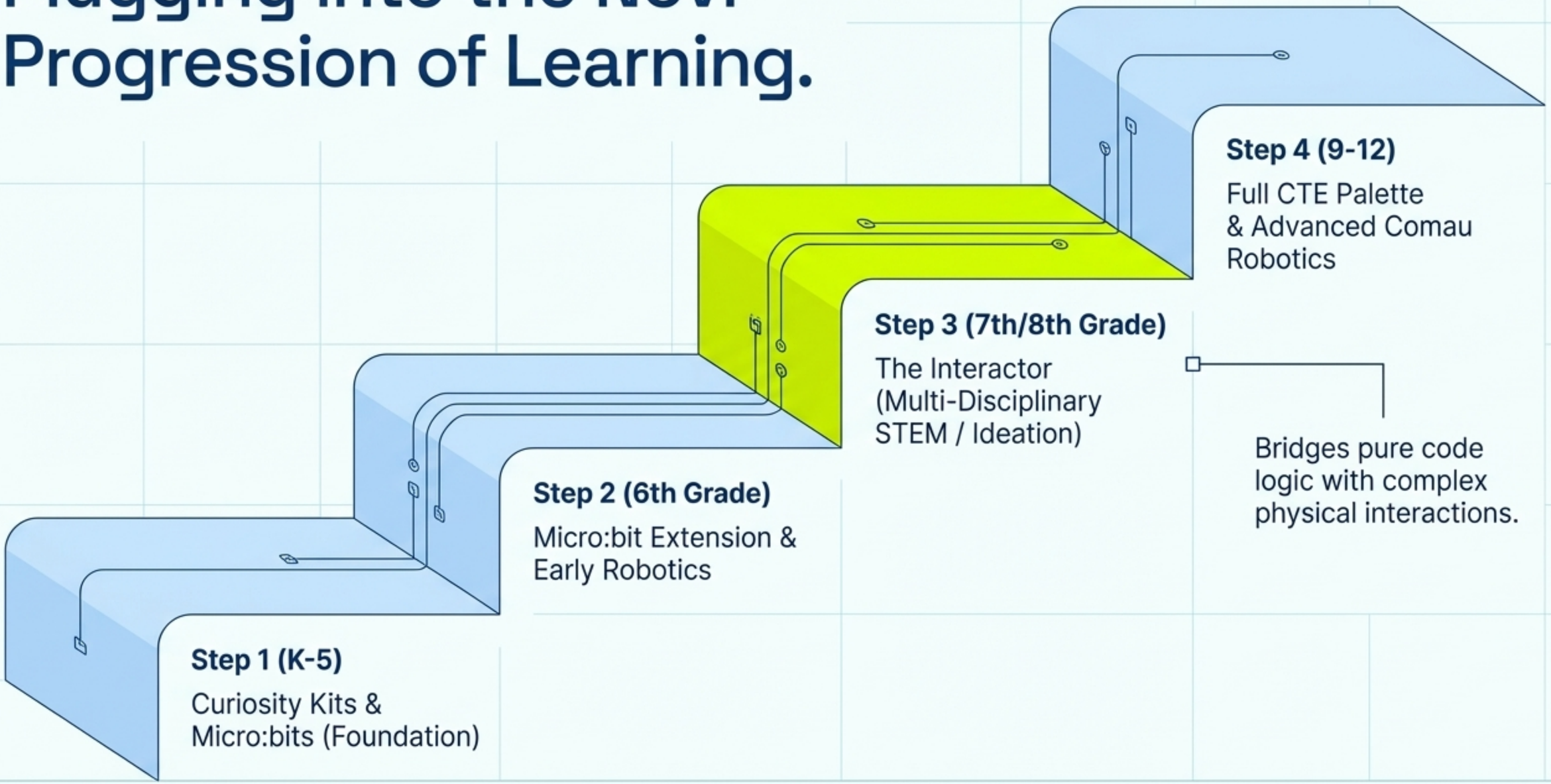
Algorithmic Music

Each student programs their Zepto node to generate specific beats, tempos, or tones based on board conditions, resulting in a synchronized physical orchestra.

Takeaway: The Interactor is not just a battle arena; it is a blank canvas for harmonizing physical inputs.

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Plugging into the Novi Progression of Learning.



Step 1 (K-5)

Curiosity Kits & Micro:bits (Foundation)

Step 2 (6th Grade)

Micro:bit Extension & Early Robotics

Step 3 (7th/8th Grade)

The Interactor (Multi-Disciplinary STEM / Ideation)

Bridges pure code logic with complex physical interactions.

Step 4 (9-12)

Full CTE Palette & Advanced Comau Robotics

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Let’s water this idea together.

- [x] The hardware is ready (BeagleConnect Zepto).
- [x] The pedagogy aligns (Liveness + Equity).
- [ ] The application awaits.

Let’s pilot the first Interactor environment in a 7th/8th-grade STEM block. Let’s see how students respond when their code steps onto a shared physical stage.



beagleboard.org



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