Sphero LittleBits

Mid-Valley
STEM-CTE HUB

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Sphero LittleBits

The Sphero littleBits STEAM Kit introduces students to electronics, invention, and design thinking through magnetic, snap-together circuits. With color-coded modules—such as power, sensors, lights, and motors—students can quickly prototype interactive inventions without soldering or programming experience. Ideal for hands-on exploration of circuits, logic, and creativity, littleBits empowers students to engineer real-world solutions, test ideas, and iterate through discovery-based learning. Whether building a buzzer alarm or a motion-triggered fan, t his kit makes STEM learning accessible, engaging, and endlessly inventive.

Grade Level

4th - 12th

Group Size

2 - 3 students per LittleBits set

Time Duration

30 - 60 minutes per build

Content of Kits

Components

- 10 Sphero Littlebits sets

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Usage

Getting Started

1. **Unbox and Sort Components** – Begin by familiarizing students with the four color-coded bit types: blue (power), pink (input), green (output), and orange (wires/connectors).

2. **Start with Guided Builds** – Use included invention guides or starter projects to help students understand how bits snap together and flow logically.

3. **Demonstrate Safe Connections** – Model how to gently snap and separate the magnetic bits—no twisting or forcing.

4. **Introduce the Engineering Design Process** – Encourage students to brainstorm, build, test, and improve their inventions as part of an iterative cycle.

5. **Assign Roles in Teams** – Have students rotate through roles like "builder," "tester," and "documenter" to promote collaboration and skill sharing.

Storage

- **Use Labeled Trays or Bins** – Keep bits grouped by type (power, input, output, wires) in small containers or sectioned boxes to speed up setup and cleanup.
- **Charge Batteries Regularly** – Designate a charging station for battery packs to ensure they're ready for each use.

Troubleshooting

- Bits Not Powering On? – Check battery charge, power bit orientation, and ensure all magnetic connections are secure and facing the correct direction.
- Circuit Not Working as Expected? – Remove all bits and rebuild step by step, checking for proper sequence: power → input → output.
- Motor Not Spinning or Light Not Blinking? – Confirm the input sensor is active (e.g., a button is pressed or motion is detected) and try swapping with another bit to rule out a faulty module.

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Activity Guide

Beginner

Buzzer Alert System
Students will build a basic circuit using a power bit, button, and buzzer to simulate a simple alert system. They'll explore how input (pressing the button) triggers an output (sound), helping them understand the logic of linear circuits.

Intermediate

Touch-Activated Fan
Using a power bit, a touch sensor, and a fan output, students will build a small cooling system that activates when touched. This introduces students to sensor-based control and encourages experimentation with input types and outputs.

Advanced

Obstacle-Detecting Vehicle
Students will create a simple wheeled vehicle using motors and a proximity sensor to avoid obstacles. They'll configure the circuit to respond when the sensor detects an object, adjusting components and testing results. This challenges students to build responsive systems and problem-solve.

Extension Activities:

Invention Showcase: Solve a Problem
Students identify a classroom or community problem (e.g., automatic hand sanitizer reminder, light-up homework bin) and build a working prototype using littleBits. They document their design process and present their solution, integrating STEM with design thinking, communication, and user-centered design.

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Learning Extensions

STEAM Connections: Engineering - Science

Learning Objectives:

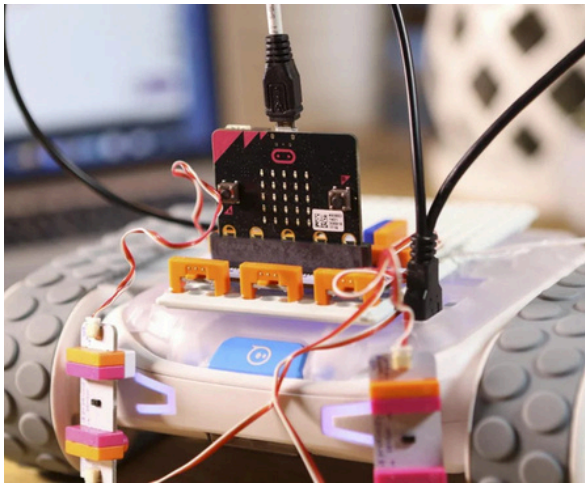
- Understand the basic principles of circuits, including inputs, outputs, power, and sensors.
- Build and test functioning prototypes using modular electronics.
- Apply the engineering design process to solve open-ended problems through invention.
- Develop logical reasoning by sequencing components to achieve desired outcomes.
- Strengthen collaborative and communication skills through group-based invention challenges.

Career Connections:

- **Electrical Engineer** – Designs and tests electrical systems and circuits used in technology and infrastructure.
- **Product Designer** – Creates prototypes of user-focused inventions using modular electronics and design thinking.
- **Robotics Technician** – Builds and maintains sensor-based machines for industrial or consumer use.
- **UX/UI Designer** – Designs intuitive and responsive user experiences, often prototyping with electronics.
- **STEM Educator or MakerSpace Facilitator** – Teaches hands-on invention and circuitry in creative, student-led environments.

Essential Employability Skills:

- Problem-Solving
- Creativity & Innovation
- Collaboration
- Communication
- Attention to Detail



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Resources and Accessibility

Safety Guidelines

- **Handle Bits Gently** – Snap pieces together and apart carefully using the magnetic connectors; avoid twisting or forcing.
- **Use with Clean, Dry Hands** – Prevent damage to the electronic components by keeping hands and surfaces clean and dry.
- **Charge Safely** – Only use approved USB chargers for battery packs, and unplug when charging is complete.
- **Avoid Short Circuits** – Always follow the correct input/output/power sequence to avoid damaging bits.
- **Supervise Use of Tools** – If scissors, tape, or mounting boards are used, ensure safe handling and proper cleanup.

Accessibility

- **Offer Flexible Roles** – Allow students to participate through design, coding, documentation, or storytelling, based on their strengths and preferences.
- **Provide Visual Instructions** – Use enlarged or printed diagrams with minimal text to support students with reading or attention challenges.
- **Encourage Peer Pairing** – Partner students strategically to support varying abilities and promote collaborative problem-solving.

Library Catalog

Library Resources

Feedback

QR to feedback survey