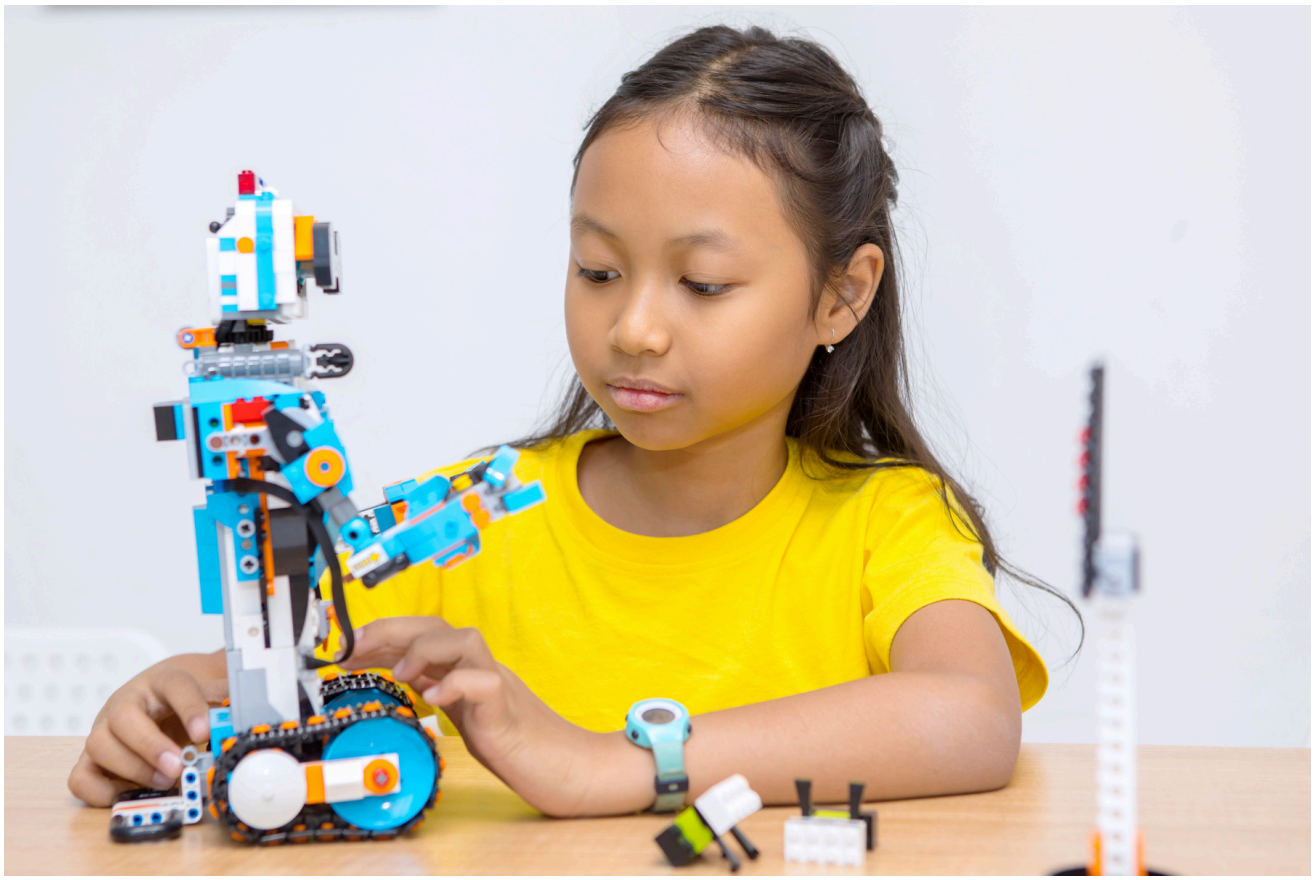
LEGO Spike Prime



Mid-Valley
STEM-CTE HUB

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LEGO Spike Prime

The LEGO® Education SPIKE™ Prime Kit combines hands-on building with block- and Python-based coding to help students tackle real-world challenges through robotics and engineering. Featuring a powerful programmable hub, motors, sensors, and colorful LEGO Technic elements, SPIKE™ Prime empowers middle and high school learners to design, build, and code functional robotic systems. Whether students are developing a self-driving vehicle, testing sensors, or engineering a creative invention, this kit fosters collaboration, computational thinking, and innovation in a STEAM-rich learning environment.

Grade Level

6th - 12th

Group Size

2 - 3 students per set

Time Duration

45 - 90 minutes per build

Content of Kits

Components

- 4 complete sets of LEGO Spike Prime

Pairs well with

- LEGO Prime Principle STEAM Kit (not included)

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Usage

Getting Started

1. **Unbox and Sort Components -** Begin by applying the provided stickers to the sorting tray compartments. Then, sort the elements from bags 1–8 into the appropriate compartments. Bag 13 contains small and essential elements that often go missing; set this bag aside until needed.
2. **Label and Number Sets -** Assign a unique number to each SPIKE Prime set and label all hardware components accordingly. This practice simplifies classroom management and helps prevent mix-ups.
3. **Install the SPIKE App and Update -** Firmware - Download the LEGO® Education SPIKE™ App on your devices. Upon first use, connect each Hub via USB to update its firmware to ensure compatibility and optimal performance.
4. **Assign Student Roles -** Encourage collaboration by assigning roles such as "Builder," "Programmer," and "Tester" within each group. Rotating these roles can provide a well-rounded experience for all students.
5. **Begin with Introductory Lessons -** Utilize the SPIKE App's built-in tutorials and lesson plans to introduce students to the basics of building and programming with SPIKE Prime.

Storage

- To maintain the completeness of each Spike Prime set ensure all pieces are returned to their original bins.
- Break down builds between class sessions and return pieces to their original bins
- Ensure all electrical elements are disconnected before storing.

Troubleshooting

- **Hub Not Powering On -** If the Hub doesn't turn on, connect it to a power source using the USB cable to charge the battery. Ensure the battery is properly inserted.
- **Bluetooth Connectivity Issues -** Ensure Bluetooth is enabled on your device. In the SPIKE App, create or open a project, then click the Hub icon on the Programming Canvas. Turn on the Hub and press the Bluetooth button to enable pairing mode.
- **Hub Overheating -** If the Hub's center button is flashing red, it may be overheating. Turn off the Hub and allow it to cool down for at least 15 minutes before using it again.
- **Motor or Sensor Not Responding -** Check all cable connections to ensure they are secure. Test the motor or sensor with a different port or Hub to determine if the issue is with the component or the Hub itself.

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Activity Guide

Beginner

Dancing Robot
Students build a simple robot using the SPIKE Prime hub and two motors, then use the SPIKE App to program a dance routine with movement and sound. This activity teaches basic motor control, loop blocks, and builds confidence in using the app.

Intermediate

Color Sorter
Using the color sensor and motor, students build a small device that detects LEGO bricks of different colors and sorts them into different zones. This activity introduces conditionals (if/then logic) and real-world applications of automation.

Advanced

Autonomous Obstacle Navigator
Students build a vehicle equipped with an ultrasonic sensor that autonomously avoids obstacles. They'll refine their code to include loops, distance thresholds, and speed adjustments, simulating real-world robotics navigation systems.

Extension Activities:

SPIKE Prime Innovation Challenge
Students work in teams to design and build a SPIKE-powered invention that addresses a classroom, community, or environmental need (e.g., a pollution detector, an auto-feeder, or a classroom alert system). They'll prototype, test, and present their solutions, integrating creativity, coding, and engineering skills.

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Learning Extensions

STEAM Connections: Electrical Engineering - Design - Physics

Learning Objectives:

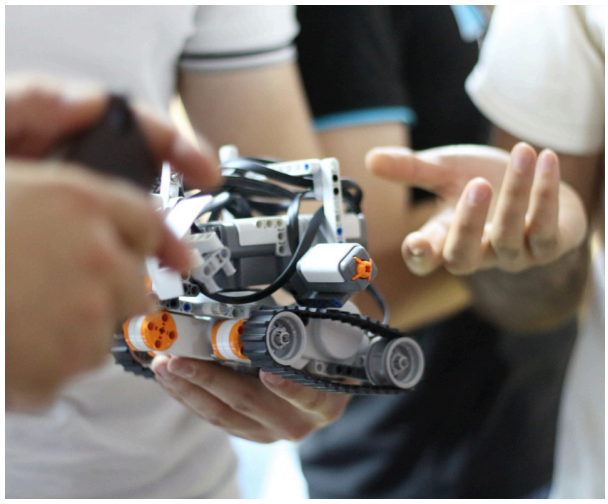
- Understand and apply fundamental coding concepts including loops, conditionals, and sensor integration.
- Explore engineering principles by building and programming mechanical systems.
- Collect and interpret real-time data from sensors to improve robotic functionality.
- Collaborate to design, build, and iterate robotic solutions to real-world challenges.
- Strengthen computational thinking and digital literacy through hands-on problem-solving.

Career Connections:

- **Robotics Engineer –** Designs, builds, and programs robotic systems for manufacturing, healthcare, or exploration.
- **Software Developer –** Uses programming logic and structured problem-solving to create apps and control systems.
- **Automation Technician –** Maintains and programs automated machines and robotic devices in industrial settings.
- **Mechanical Engineer –** Applies design and motion principles to machines, tools, and vehicles.

Essential Employability Skills:

- Problem-Solving
- Critical Thinking
- Collaboration
- Communication
- Creativity
- Innovation



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Resources and Accessibility

Safety Guidelines

- **Supervise Cable and Port Use -** Ensure students insert and remove sensor and motor cables gently from the SPIKE™ Hub to prevent port damage.
- **Charge Responsibly -** Use only the provided USB charging cables and hubs. Charge devices in a safe, dry area and unplug after charging.
- **Use on Stable Surfaces -** Run robotic builds on flat, clean surfaces to prevent tipping, crashing, or damaging parts.
- **Report Malfunctions Promptly -** Instruct students to alert an adult if they notice overheating, unusual smells, or physical damage to the hub or components.

Accessibility

- **Use Visual and Enlarged Instructions -** Project step-by-step build guides and coding examples for students who need visual support or larger displays.
- **Allow Flexible Team Roles -** Assign roles based on strengths—builder, programmer, tester, or documenter—to support all learners, including those with mobility or sensory challenges.
- **Incorporate Screen Reader– Friendly Coding -** For students with visual impairments, consider using SPIKE's Python-based interface with compatible screen reader tools.
- **Adjust Build Platforms -** Provide adjustable-height tables, trays, or lap boards for students who use wheelchairs or need extra surface stability.

Library Catalog

Library Resources

Feedback

QR to feedback survey