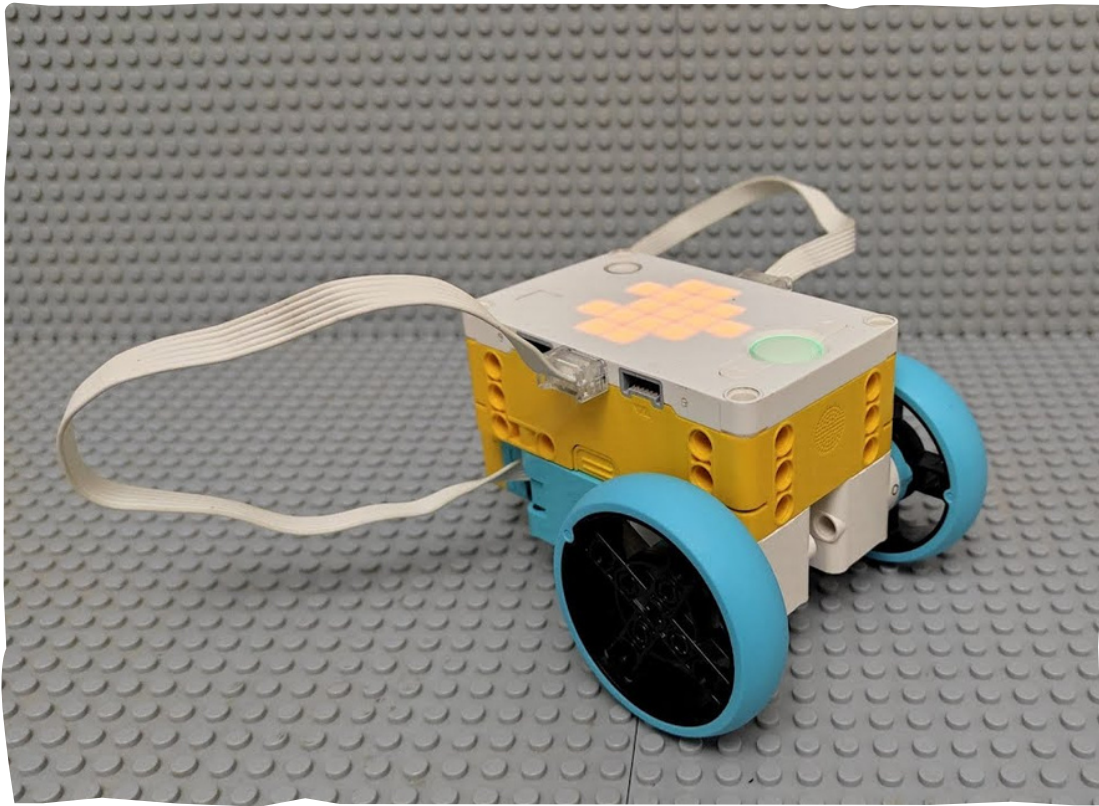


LEGO Robots for Beginners



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STEM-CTE HUB



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LEGO Robots - Beginners

LEGO Robots are part of the Special Collection. The borrower must sign the agreement before using the pick-up and drop-off kit; the courier service does not transport this kit.

LEGO Robots for Beginners is a great entry point for incorporating robotics into middle and high school classrooms. With simple builds that can be added to and straightforward block coding that can be customized as skills grow. LEGO Robots for Beginners gets students working with tech while practicing critical-thinking and problem-solving skills by adjusting coding in real-time to meet the requirements of hands-on projects.



Grade Level

6th - 9th

Group Size

2 - 3 per robot

Time Duration

60 minutes - multi-session

Content of Kits

Components

- 10 Modified LEGO Spike Prime Kits (Intro, Advanced, and Extension sets)
- 10 Android Tablets - Code = 3141
- 10 Rolls of Scotch Blue Tape



Usage

Getting Started

1. Be sure to charge all motor blocks and tablets before class begins. Look through each bin and ensure all bins have a “basic build” bag, “advanced activity” bag, “extension activity” bag, tape, and charging cord.
 2. Before class, be sure to explore the app and watch the videos (links provided) so that you understand how to operate the app and the basics of block coding.
 3. Create groups of 2-3 students per robot and have them roles. Have the teams build the basic robot from the second provided video.
 4. Walk students through using the app and how use the block coding effectively. Use the videos as a guide to introducing students to the app and coding techniques.
 5. Help groups connect, one at a time, their robots to their tablets. Once every team is connected allow the students to design their own maze using the blue tape and code the robot to be able to navigate the maze.
- Videos to get you started** (links work in online PDF)
- [Overview of the LEGO Spike Prime App](#)
 - [How to Build the Robot and basic block coding in LEGO Spike App](#)

Storage

- Store each LEGO SPIKE Prime set in labeled bins or containers to keep parts organized and prevent loss.
- Use compartment organizers for small pieces (connectors, pins, axles) to make setup faster.
- Keep tablets, charging cords together in a designated tech bin or charging station.
- Store robots partially disassembled (motors/sensors removed if applicable) to reduce strain on components.
- Use the inventory checklist in the kit for quick audits before and after use.

Troubleshooting

- **Robot not moving correctly:** Check that motors are securely connected to the correct ports and that code matches the motor setup.
- **Program not running:** Ensure the tablet is properly connected to the hub via Bluetooth and that the correct program is downloaded to the robot.
- **Robot stops unexpectedly:** Verify battery charge levels in both the hub and tablet.
- **Code not behaving as expected:** Review sequencing of blocks, especially timing, loops, and order of commands. Test in smaller steps.



Activity Guide

Beginner

Design and Code a Maze (Use Intro LEGO set)

In small teams, students use blue tape to create a basic pathway on the floor with straight lines and varied degrees of turns. Teams will use the LEGO Spike app to program simple movements (forward, stop, turn, etc.) with block-based coding to guide the robot through the maze. Students begin by testing individual movements, then sequence commands to complete the full path. Encourage teams to observe how changes in timing and direction affect the robot's movement and make adjustments as needed. Roles (builder, coder, tester) can rotate to support collaboration and shared learning.

Advanced

Obstacle Course Challenge (Use Intro and Advanced LEGO sets)

Students apply advanced coding and control skills to navigate a complex obstacle course. In teams, students design a course using blue tape, creative barriers, and checkpoints that include multiple turns, pathways, and challenges requiring precise movement. Using the app and robot, teams will program a detailed sequence of movements (distance, turns, speed, and timing) to guide the robot through the course. Students must rely on careful planning, measurement, and iterative testing to achieve accuracy. Teams test and refine their code to improve performance. Rotate roles (builder, coder, tester) to ensure full participation.

Intermediate

Code a Robot Dance Routine (Use Intro LEGO set)

Students expand their coding skills by creating a choreographed robot dance. In teams, students use the LEGO SPIKE Prime app and robot to program a sequence of movements that may include driving, turning, lights, and sounds. Using block-based coding, teams will combine multiple commands into a coordinated routine. Students are encouraged to incorporate patterns, timing, and repetition (loops) to enhance their routine. After testing and refining their code, teams can present their robot dance to the class. This activity strengthens sequencing, creativity, and computational thinking while reinforcing collaboration and iterative design.

Extension Activities:

Battle Bots (Use all three LEGO sets)

Students apply their robotics, coding, and engineering skills in a friendly competition by designing and programming a "battle bot." In teams, students modify their LEGO SPIKE Prime robot to push, block, or outmaneuver an opposing robot within a defined arena. Students plan their design, test different strategies, and refine both build and code through multiple rounds. Encourage teams to iterate between matches, improving performance based on outcomes.



Learning Extensions

STEAM Connections: Engineering - Math - Technology

Learning Objectives:

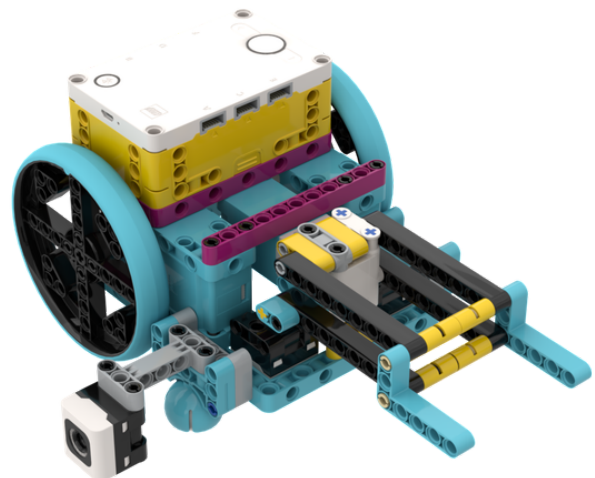
- Develop foundational understanding of robotics systems, including sensors, motors, and basic programming logic in real time.
- Apply computational thinking by creating, testing, and modifying block-based code sequences.
- Explore cause-and-effect relationships between coding inputs and physical robot actions.
- Practice sequencing, loops, and conditional logic through hands-on programming activities.
- Enhance collaboration skills by working in teams to design, build, and program robots.
- Connect robotics concepts to real-world applications in automation, manufacturing, and technology.

Career Connections:

- Robotics Technician
- Software Developer / Programmer
- Mechanical Engineer
- Automation Engineer
- Computer Scientist
- Electronics Technician
- STEM Educator

Essential Employability Skills:

- Problem Solving & Critical Thinking
- Collaboration
- Effective Communication
- Adaptability
- Technology Literacy
- Attention to Detail
- Creativity & Innovation
- Persistence





Resources and Accessibility

Safety Guidelines

- Keep small pieces organized and away from mouths to prevent choking hazards.
- Ensure wires, motors, and sensors are properly connected before operating robots.
- Avoid forcing pieces together or pulling components apart roughly.
- Keep workspaces clear to prevent tripping hazards or loss of small parts.

Accessibility

- Provide step-by-step visual instructions and diagrams to support diverse learners.
- Offer flexible roles (builder, coder, tester, documenter) so students can engage based on strengths.
- Use color-coded pieces and labels to support organization and comprehension.
- Allow additional time for building, coding, and troubleshooting as needed.
- Provide guided practice and modeling before independent work.
- Offer alternative input methods (touch, stylus, or adaptive tools) for coding activities.
- Adjust build complexity (simpler models or pre-built components) to meet varying ability levels.
- Encourage peer support and collaborative problem-solving to build confidence and inclusion.

Library Catalog



Library Resources



Feedback

QR to feedback survey

