

Teacher Resources: Sphero BOLT+

Last updated: July 2025

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STEMbound Contact Information

Please contact us as soon as possible if something is missing, damaged, or you would like support or professional development with the equipment. Thank you!

Contact	Contact Information
STEMbound Team	Email: STEMbound@sourcewell-mn.gov

Website Quick Links		
STEMbound Home Page	Equipment Check-out Library	Consultant-led Learning
	Equipment Request	Consultant-led Request
STEM Network	Partnership in Planning Request	Professional Learning

You can access the above links and more at: <https://mn.sourcewell.org/education/STEMbound>

Equipment Snapshot

Purpose

The Sphero BOLT+ is an app-enabled robotic ball designed to teach coding, robotics, and STEM principles through interactive play and hands-on learning. It features an 8x8 programmable LED matrix, infrared communication, sensors (gyroscope, accelerometer, compass), and Bluetooth connectivity. BOLT+ enables students to learn block-based coding with Sphero EDU app and JavaScript, making it a versatile tool for various skill levels.

- Age appropriateness: Recommended for ages 8+. However, younger learners can use it with simplified activities and coding concepts such as Draw & Drive modes.
- Common uses: Interactive coding lessons using block or text-based, problem-solving and engineering challenges, creative projects with custom LED animations, and collaborative exercises.
- Classroom applications: Sphero is often used in STEM curriculum. It can also be used in physics experiments with speed and acceleration, math with angles and geometry, and many other group projects encouraging teamwork and design thinking.

Operation

- **Charging**: Place the robot in the charging cradle. Sphero BOLT+ lasts about 6 hours per charge.
- **Connectivity**: Pairs via Bluetooth with devices running the Sphero EDU or Sphero Play app.
- **Programming**: Controlled through block-based coding, JavaScript, or Draw & Drive interface.
- **Sensors**: Data from gyroscope, accelerometer, compass, and light sensors can be used in programs.
- **LED matrix**: Custom animations or data visualizations can be programmed.

Maintenance

- **Charging**: Keep the robot charged using the included powerpack. Avoid overcharging for battery health.
- **Cleaning**: Wipe the outer shell with a soft, damp cloth; avoid submerging or exposing to harsh chemicals.
- **Firmware updates**: Regularly update firmware via the app to ensure optimal performance.
- **Storage**: Store in a cool, dry place. Avoid prolonged exposure to direct sunlight or extreme temperatures.

Safety Considerations

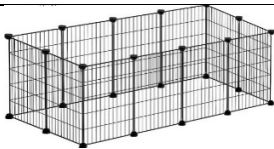
- Sphero BOLT+ is designed for children 8+, but younger users should be supervised.
- Follow screen time guidelines appropriate for age groups to ensure healthy usage.
- Account creation should comply with privacy rules; children under 13 should not create their own accounts without educator management.
- Do not throw or drop the device; use on smooth surfaces. Avoid water exposure (the shell is water-resistant but not waterproof for submersion).
- If the device overheats, stop use immediately and disconnect from charging. Allow to cool and contact STEMbound if support is necessary.

Possible Projects

- **Maze navigation**: Program BOLT+ to autonomously navigate a maze or obstacle course.
- **Artbot**: Attach a marker and code the robot to draw patterns or geometric shapes.
- **Data Logging**: Use sensor data to measure acceleration, angles, or light levels in experiments.
- **LED Animations**: Create custom graphics or emoji displays on the LED matrix.

Contents Checklist

Please ensure all items and totes are present before and after use.

Item	Picture	Quantity
Sphero Power Pack - Charging cord - Sphero tape - Heading compass/protractors - Educator Guide - Challenge Cards 15 BOLT+ robots		1 case
Bunny Cages (for space management)		24 edges plus connectors
Cones		10
Code mats and activity cards		1 Space/Soccer mat and 4 sets of activity cards 1 City/Golf mat and 4 sets of activity cards
Sphero ramps and terrain park		8 ramps plus connectors
Small green ramps		4 ramps
Sphero Turbo covers		15 covers

Some images courtesy of Sphero, used with permission

Usage instructions

Setup Instructions (10-15 minutes)

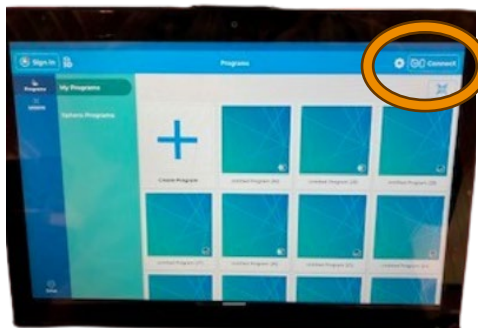
1. BOLT+ devices will come in the power pack. Plug the power pack in to ensure all robots are fully charged. Keep the lid open while charging. You will know the charging cradle is receiving power when there is a solid blue LED light on the charging cradle. Ensure all LCD screens are facing up and parallel to the ground as robots will shift in transport.
2. If BOLT+ is charging correctly, the blue LED light on the cradle will begin flashing. The LED lights on BOLT+ will also light up.
 - If the blue LED remains solid, adjust BOLT+ until the battery has a strong connection with the charging base and the LED light begins flashing blue.
 - When the lights on the charging bases turn solid purple, this indicates that your BOLT+ robots are fully charged.
3. When dead, BOLT+ devices need about 6 hours for a full charge.
4. Download the Sphero Edu app on your device from the desired app store.
5. To pair the robot with your device, make sure Bluetooth is on.

Operating instructions

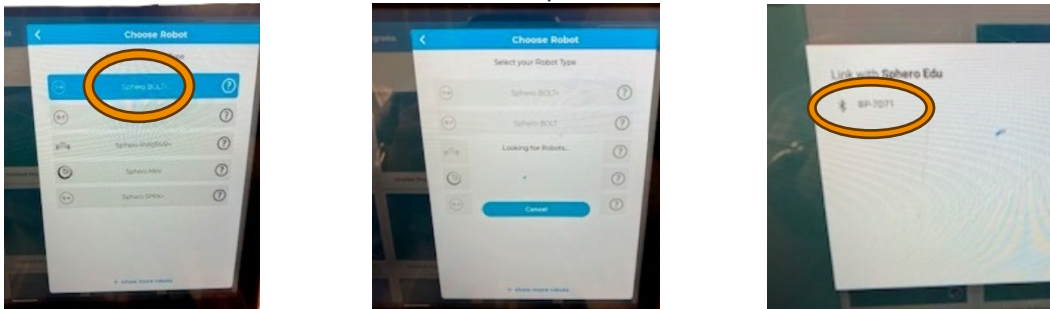
- Before pairing your device to the robot, wake up BOLT+ by picking it up off the charger, or placing it on the charger. There is no manual power button. BOLT+ will display a unique code.



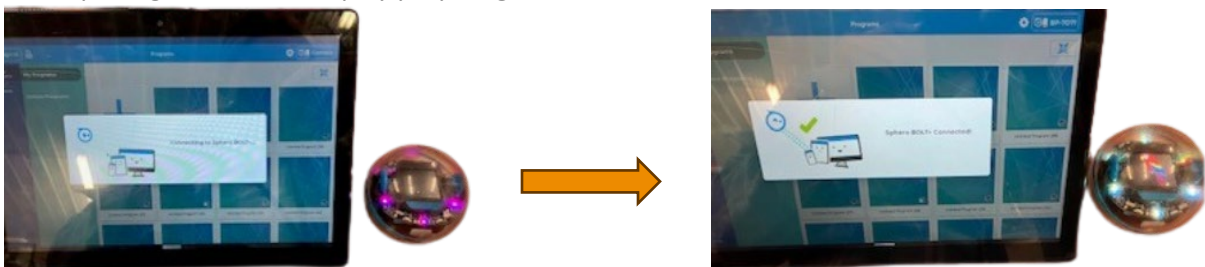
- Open the Sphero Edu app. Tap “Connect Robot”



- Select “BOLT+” from the list of robots. Select your BOLT+ from the list of available robots.

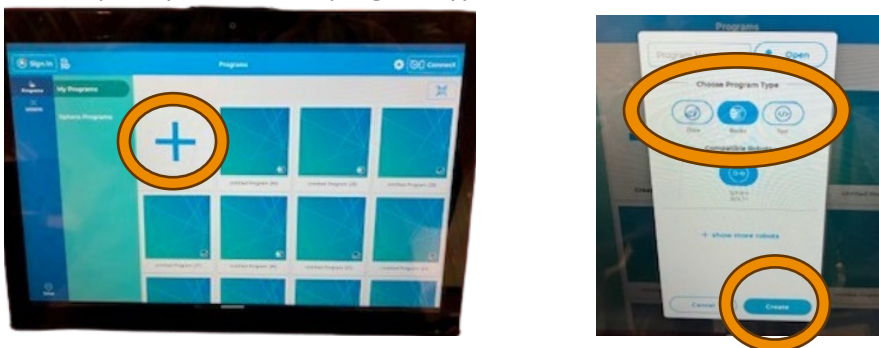


- While pairing, BOLT+ will display purple lights and turn on if successful.

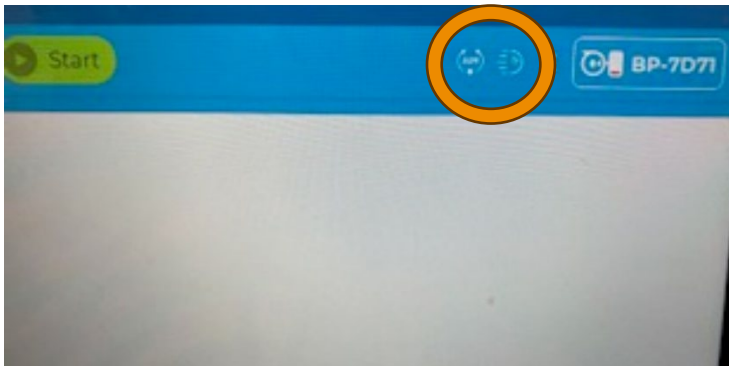


If BOLT+ ever becomes disconnected, repeat this process.

- To create a new program, select the blue “+” sign and choose from block coding, drawing, or writing JavaScript. Tap the desired program type and then “Create.”



- To “Drive” or “Aim” the robot, select the icon in the upper right corner and follow the on-screen prompts.



Best Practices

- Use on smooth, flat surfaces for consistent movement.
- Clear the area of obstacles for driving or coding movement.
- Begin with pre-made programs before progressing to custom coding.
- Keep device updated through the app to access new features.

Cleaning and Maintenance

Cleaning

- Wipe down after every class use, especially if used on floors or outdoors.
- Dampen a cloth with water and gently wipe the surface of BOLT+.
- Avoid getting water into the charging contacts.
- Keep in a dry, dust-free space and avoid direct sunlight or extreme heat.

Maintenance

- Recharge after each use; don't leave discharged for long periods.
- Check firmware updates regularly via the Sphero Edu app.
- Inspect the shell for cracks or scratches often as these may impact sensors.
- Re-pair to the device via Bluetooth if connection becomes unstable or lost.
- If you are not using the BOLT+ robots for a few weeks, it's best to return all BOLT+ robots to their charging cradles, charge to about 50%, unplug the Power Pack, and store at room temperature.

Troubleshooting Guide

Problem	Solution
BOLT+ not connecting via Bluetooth	Ensure Bluetooth is on, fully charge BOLT+, restart device, try reconnecting
BOLT+ not moving after program starts	Check for obstacles, retry program, verify battery level and Bluetooth pairing
LED matrix not lighting up	Restart BOLT+, check for firmware updates
BOLT+ not charging	Align contacts properly on charger, check power source
Cannot find BOLT+ in device list	Reset Bluetooth on device, move away from other BOLTs to avoid interference

Extension Options

Cross-curricular uses

Grades K-2	
ELA	- Students program BOLT to travel to “story” stations and narrate plot points. - Benchmark: Retell familiar stories in sequence including details
Math	- Shape Explorer: use Draw canvas to have BOLT trace circles, squares, and triangles. - Benchmark: Manipulate and describe attributes of 2-D shapes - Benchmark: Correctly name shapes regardless of orientation or size - Use LED colors to represent units (e.g., 1 red = 1, up to five), then drive BOLT the counted number of tiles - Benchmark: Counting and one-to-one correspondence
Science	- Use BOLT’s light sensor and move BOLT towards the light mimicking a bug - Understand patterns of light and sound
Social	- Drive BOLT past landmarks; discuss roles at each landmark (e.g. school, fire station, post office) - Benchmark: Identify places and their purposes
Other	- Phy-Ed: Guide BOLT through a simple floor obstacle - Benchmark: Practice locomotor skills - Music: Program LEDs to flash in a simple rhythm - Benchmark: Sing/play simple rhythms and melodies
Grades 3-5	
ELA	- Students draft BOLT commands as a “how-to” paragraph. - Benchmark: Write clear procedural texts
Math	- Drive BOLT around shapes and calculate perimeters. - Benchmark: Apply perimeter formulas
Science	- Test how ramp angle affects speed using sensor data. - Benchmark: Apply evidence to design a device using energy transfer
Social	- Program BOLT across a classroom map of MN regions stopping at map details and landmark sights. - Benchmark: Recognize political and geographic boundaries
Other	- Art: Dip BOLT in paint and roll patterns on paper. - Benchmark: Experiment with artistic techniques - Music: Map note pitches to LED sequences. - Benchmark: Demonstrate performance techniques

- Phy-Ed: Teams code BOLT through relays focusing on teamwork.
 - Benchmark: Demonstrate teamwork

Grades 6-8

ELA

- Students propose and program a BOLT-based idea
 - Benchmark: Write arguments to support claims with reasoning

Math

- Use block code to navigate to (x, y) points
 - Benchmark: Graph points on the coordinate plane

Science

- Use accelerometers to record and graph movement.
 - Benchmark: Develop and use models of data patterns

Social

- Map and program BOLT along expedition paths (e.g. Lewis & Clark).
 - Benchmark: Describe movement's impact on societies

Other

- Art: Create images using the 8 x 8 LED grid.
 - Benchmark: Generate and refine artistic works
- Music: Code rhythmic LED/drive sequences synced to beats
 - Benchmark: Demonstrate performance techniques
- Phy-Ed: Design BOLT putting course and keep score.
 - Benchmark: Analyze and improve performance metrics

Grades 9-12

ELA

- Create user guides or tutorials for BOLT-based systems
 - Benchmark: Produce clear, coherent writing appropriate to task and audience

Math

- Collect speeds, plot histograms, calculate mean and standard deviation.
 - Benchmark: Use appropriate tools to analyze data

Science

- Use BOLT to model projectile motion or circular motion.
 - Benchmark: Analyze data to support motion models

Social

- Program BOLT to trace local voting district boundaries; analyze representation.
 - Benchmark: Analyze civic structures and roles

Other

- Art and Music: Synchronize multiple BOLTs and sound to produce light-sound installations.
 - Benchmark: Experiment with complex art-making processes including technology
 - Benchmark: Perform with technical demand
- Phy-Ed: Code BOLT for soccer-like accuracy drills.
 - Benchmark: Develop strategic understanding to enhance performance

Additional Resources

- [BOLT+ Quick Start Guide](#)
- Sphero Support: <https://sphero-support.gorgias.help/en-US/articles/sphero-bolt+-131272>
- [Sphero BOLT: At-Home Guide](#)
- [BOLT+ Power Pack Educator Guide](#)
- [BOLT lessons](#)
- [BOLT+ Challenge Cards](#)
- [Educator Resources](#)

Video tutorials

- [BOLT+ Power Pack](#)
- [BOLT+ Basics](#)