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ROBOTICS

Code & Roll with Sphero Bolt

IDEA PACKET SPONSORED BY:

FPL

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The Code & Roll with Sphero Bolt project aims to transform how students learn about coding and robotics. By providing a hands-on, interactive experience, students are empowered to become active creators and problem solvers, applying coding concepts to control Sphero Bolt robots in engaging activities. This approach not only builds technical skills but also fosters creativity, critical thinking, and collaboration, while sparking a lifelong passion for STEAM fields. The goal is to equip students with the tools and confidence to thrive in a technology-driven world, preparing them for future careers and empowering them to become innovators and leaders.

ELA.K12.EE.4.1: Use appropriate collaborative techniques and active listening skills when engaging in discussions in a variety of situations.

MA.K12.MTR.2: Demonstrate understanding by representing problems in multiple ways.

MA.K12.MTR.3.1: Complete tasks with mathematical fluency.

SC.3.5.CS-CP.2.2: Create, test, and modify a program in a graphical environment (e.g., block-based visual programming language), individually and collaboratively.

SC.3.N.1.In.1: Ask questions, explore, observe, and identify outcomes.

SC.5.5.CS-CP.1.1: Design a solution to a real-world problem by breaking it down into smaller, manageable tasks. (This reflects the project's focus on problem-solving and computational thinking.)

SC.68.CS-CP.2.1: Create algorithms using sequencing, selection (if/then/else), and repetition (loops) to solve problems. (These are fundamental coding concepts that students will practice with Sphero Bolt.)

SC.68.CS-CP.4.2: Decompose a problem into parts to facilitate the design, implementation, and review of programs. (This connects to the project's emphasis on breaking down complex tasks into smaller, manageable steps.)

SC.912.CS-CP.4.1: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs. (This standard applies to older students and reinforces the importance of problem decomposition in coding.)

This hands-on course introduces students to the exciting world of coding and robotics using Sphero Bolt, a programmable robot ball. Students will learn fundamental coding concepts through interactive activities, engaging challenges, and collaborative projects. By designing and executing programs for Sphero Bolt, students will develop problem-solving skills, computational thinking, and a passion for STEAM fields.

COURSE OBJECTIVES:

- Master basic coding concepts like sequencing, loops, and conditionals.
- Apply computational thinking and problem-solving skills to program Sphero Bolt.
- Collaborate effectively in teams to design and refine Sphero Bolt programs.
- Connect coding and robotics concepts to real-world applications in various disciplines.
- Foster a positive attitude towards STEAM subjects and build confidence in technological skills.

COURSE OUTLINE:

Introduction to Sphero Bolt and SpheroEdu App

- Explore the Sphero Bolt robot's features and capabilities.
- Navigate the SpheroEdu app interface and tools.
- Learn basic movements and controls.

Coding Fundamentals with Block Coding

- Understand the building blocks of coding: sequencing, loops, and conditionals.
- Create simple programs to make Sphero Bolt move, change colors, and make sounds.
- Solve coding challenges and mazes.

Intermediate Coding with Sensors and Events

- Utilize Sphero Bolt's sensors (light, accelerometer, gyroscope) in coding.
- Create programs that react to events and environmental changes.
- Design interactive games and activities with Sphero Bolt.

Advanced Coding with Functions and Variables

- Introduce functions and variables to create more complex programs.
- Design custom animations and light shows with Sphero Bolt.
- Explore real-world coding applications through project-based learning.

Competitions

- Discuss different Sphero Bolt competitions.
- Participate in a Sphero Bolt competition (in-class or external)
- Reflect on the competition experience and identify areas for improvement.

Introduction to iBOT: BOLT

- Welcome to iBOT Bolt!
- This BOLT activity will give you the tools you need to get started!
- Learning Objectives:
- I can connect my robot.
- I can aim my robot.
- I can drive my robot.

| **EXPLORATION** What is coding and how is it used?	Coding is all around you. The websites you browse, your favorite video game, a rocket launching to Mars, and your BOLT spinning in a circle are all enabled by code. Coding is telling something else what to do through step-by-step instructions. Within Sphero Edu, you can code, or program, your BOLT to draw a picture, play a game, dance to a song, and more.
CANVASES	Sphero Edu offers three different coding "canvases" - Draw, Block, and Text - that

move from beginner to advanced coding skills:

- **Draw:** Beginners can give robots commands by drawing a path that represents code for their robot to follow.

- **Block:** Intermediate coders can use scratch blocks to learn more advanced logic.

- **Text:** Advanced programmers can use text programming and write their own JavaScript.

Let's begin by connecting your robot to the Sphero Edu app on your device. You can find more information about device compatibility here.
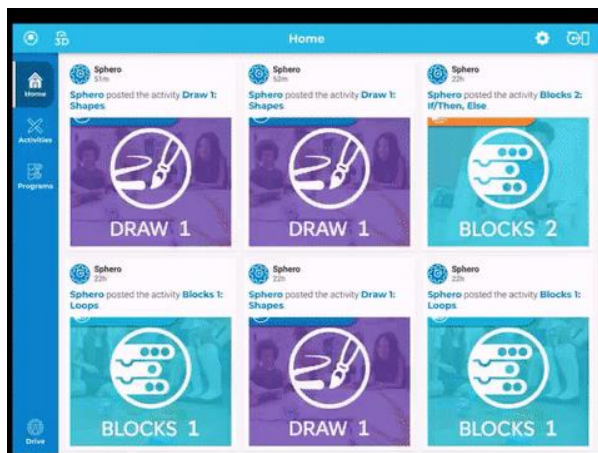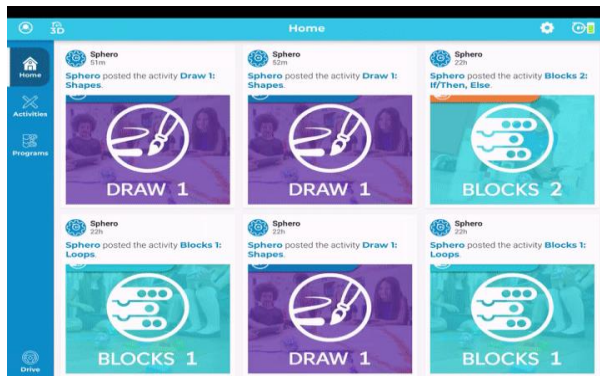
4. Open the **Sphero Edu app** and make sure Bluetooth is working.

5. Tap the "Connect to Robot" icon at the top right of your screen.

6. Select your BOLT from the robot list.

7. Hold your robot next to the device and select it to connect. If you are using multiple

SKILLS BUILDING
Connecting your Sphero BOLT
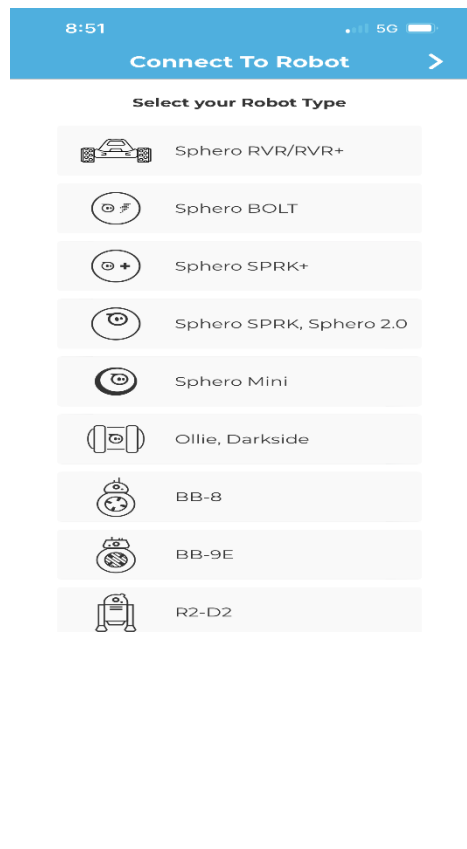
robots look for the robot with your symbol.
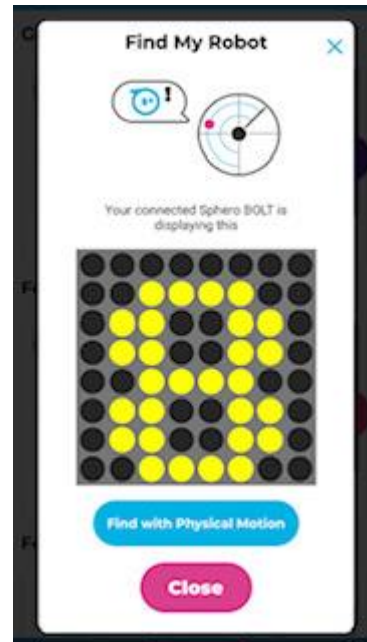
Aim Robot

Now that your BOLT is connected to the Sphero app, let's practice aiming. All BOLTS need to be "aimed" and oriented relative to your position, so that forward for the robot, and you are the same direction.

8. Place your robot on the floor or flat surface.

9. In the app select "Drive".

10. Tap the "aim" button.

11. Drag the aim ring until your robot's blue "taillight" is pointing directly at you.

←

1. Place Sphero SPRK+ on the ground.

2. Drag the aim ring until Sphero SPRK+'s blue tail light faces you.
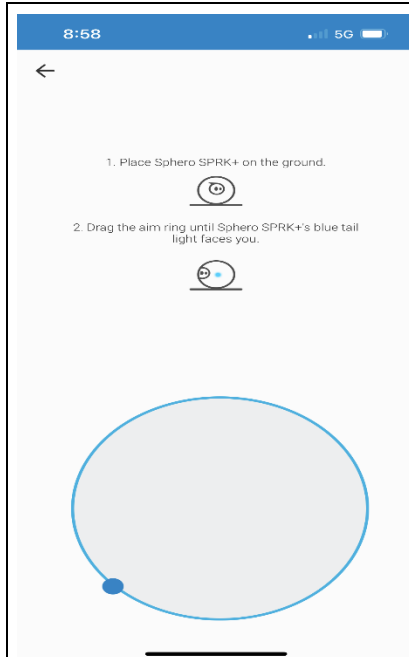
Drive Robot
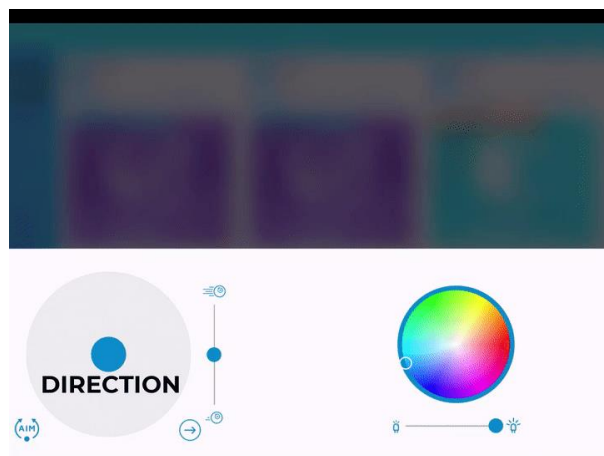
Your BOLT should now be aimed and connected to the Sphero app. From the drive screen, you can drive your robot.

12. Drag the blue circle inside the gray circle to drive your robot and control its direction.

13. The blue circle on the vertical line controls the speed.

14. Change your BOLTS color by dragging the white circle around the color wheel.

Practice aiming and driving your robot by moving it from one side of the room to the other and back again.

DIRECTION

(AIM)

MATERIALS:

- Sphero Bolt robots
- SpheroEdu app
- Tablets or computers
- Charging cables
- Maze materials (optional)
- Art supplies (optional)

RESOURCE LIST:

Sphero Official Resources:

Sphero Edu App: The heart of programming Sphero Bolt, this app offers a variety of coding interfaces (block-based, text-based) and activities to guide learners of all levels. https://edu.sphero.com/landing

Sphero Edu Website: Includes teacher guides, lesson plans, activity ideas, and tutorials to **support classroom implementation. https://sphero.com**

Additional Coding Resources:

Code.org: A comprehensive platform with coding lessons and activities for all ages. https://code.org/

Scratch: A visual programming language and community where users can create and share interactive stories, games, and animations.

Tynker: A platform with coding courses and activities for kids and teens, including robotics-specific lessons. https://www.tynker.com/

Competition Resources:

Sphero Global Challenge: An annual competition with various challenges for different age groups, focusing on creativity, problem-solving, and coding skills. https://edu.sphero.com/landing