

Basics of Sphero Robotics + 3 Awesome Sphero STEM Activities

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Vivify STEM



The Basics of Sphero

Alright, let's get into the reasons on why Sphero is worth the investment. Here are the basic components at the core of both of Sphero's education focused robots, the SPRK+ and BOLT:

1: Programming capabilities

By using the Sphero Edu app (which is completely free by the way) you can control the robot by either driving or programming it. When driving the robot, you use a joystick type circle that allows you to move the robot around. For the programming part there are 3 different options:

1. **Draw** - The Draw choice is great way to introduce robotics to elementary students. You draw a shape in the app, and the robot will follow that shape outline.
2. **Block** - Block programming is similar to what you would see on [Hour of Code](#) or [Scratch](#) and is geared more towards middle and high school students. In the updated app, they have now streamlined their blocks with Scratch.
3. **Text** - Text programming allows you to program the robot in JavaScript. This is a great way to bring in those real world skills for high school students that may eventually want to go into the field of computer science.

2: Extremely durable

To my horror, I once had someone throw a SPRK+ on asphalt (they thought it was a toy ball). I was 100% sure it was broken. However, there was no damage, and that same robot is still working to this day! We also use these robots at [family nights](#) that reach thousands of people a year, from preschoolers to high school students. Amazingly, the original 12 we bought two years ago are *still* going strong to this day.

3: Waterproof

Yes, they are waterproof. Besides making them more durable, there are many possibilities here!

4: Outside Shell Design

Traveling between schools, I love that these robots are compact. SPRK+ and BOLT both have a hard spherical shell about the size of a baseball. So for anyone that has a mobile classroom, these are great for carrying from classroom to classroom. Sphero offers an [education pack](#) (available for both SPRK+ and BOLT), that's basically a charging suitcase! So you can plug the suitcase in and charge all the robots at the same time, while having a super cool way to carry them. The new BOLT education pack can carry up to 15 at one time!

5: No Building Required

Another thing I love about their design is that you don't need to actually build the robot before you can start jumping into the programming. These robots are ready to be used right out of the box, so you can spend more time teaching computer science rather than picking up building pieces all over your classroom floor.

3 Awesome STEM Challenges with Sphero

Are you ready to start using Sphero in your classroom or program? Here are three fun STEM activities to keep the ball rolling in your classroom. These can be used with both SPRK and the new BOLT.



1: Boat Racing

In a summer camp, I used Sphero to have the students make robot powered boats. The goal was for the robot to carry a boat full of pennies across the water. This is basically a chariot challenge in the water, and you can connect to real-world tug boats. A little messy, but a lot of fun! Check out some examples [here](#).

2: Sphero Painting

During STEM Family Nights, families love driving Sphero robots around an obstacle course to learn the basics of controlling a robot. Another popular station is a STEM mural, where students draw something related to a STEM career. To mix things up this year, we decided to merge the two activities to let our robots create the mural!

This fun activity is inspired by the work of artist Jackson Pollock, who was known for his abstract 'drip style paintings'. You'll be using the Sphero robot to paint across the canvas

and the result is very similar to what Pollock painted! For this activity, I would suggest buying rubber covers for your robots. My favorite ones are [here](#). Once the Sphero is in the rubber cover, wrap it in [Press n' Seal wrap](#) just for extra protection from the paint. For the canvas area, use butcher paper and then create a barrier around the canvas to prevent the robots from escaping and painting the floor. Ideas for creating a barrier include long wooden planks, pool noodles, and even hula hoops! I decided on [large plastic bins](#) for a portable solution that is easy to clean. Place the butcher paper inside the bin and add about a quarter-size of paint along the edges of the paper. Students drive the Sphero through the paint and across the canvas! You can check out some cool videos of this in action [here](#) and [here](#).

3: Chariot Race

In Space Club, we added a space twist to the usual STEM chariot challenge! For this activity, instead of building just a chariot, students will build their own lunar rover. The goal of the challenge is to create a chariot that can carry as many 'astronauts' (ping pong balls) as possible *and* reach the finish line first! This activity took around an hour. You can access the challenge handout with design constraints in the locked "Vivify Resources" section. Subscribe to the Vivify blog to gain access!

For this activity, we gave each group of 3-4 students, one 18 oz cup. The cup fits perfectly over the SPRK+ and BOLT. The challenge was to attach items to the cup to be pushed by the robot. Additional building supplies included wooden dowels, hot glue, modeling clay, foil, pipe cleaners, Popsicle sticks, construction paper, card stock, and cardboard.

We made 3 lanes with painters tape that were about 20 ft long. Some tips for building:

1. When the Sphero moves it spins as well. So whatever is attached to the cup will start spinning causing ping pong balls to fall out.
2. Ping pong balls are very light, and driving too fast may cause them to pop out.

After the testing, allow the students go back and re-design their chariot. At the end of the building time, we had all the teams compete against each other, and it was so popular that we even had students and teachers ask if they could stay later to continue racing! Check out this clip from a recent chariot challenge in [Space Club](#) Family Night!

We hope you have fun incorporating Sphero robots into your STEM program! Stay tuned for my next post that explores the differences between Sphero SPRK+ and BOLT plus even more STEM challenges!

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Aspen is a mechanical engineer and runs an after school [Space Club](#) program in San Antonio, Texas. Aspen was selected as an official [Sphero Hero](#) for her innovative use of Spheros in the classroom. You can follow her on [Instagram](#) or [Twitter](#) for more STEM ideas!