SWIM MEET

OVERALL TIME *Up to 1-hour lesson*

GROUPS *Three to four kids*

PROGRAMMING LEVEL *Intermediate Block: Simple Controls (Loops), Sensors, and Comments*

CONTENT THEME *Art*

OBJECTIVE

- **I will identify how the Sphero BOLT can "drive" in water aided by different materials.**
- **I will use the Draw or Block Canvas to program the Sphero BOLT to complete a water course with different Sphero BOLT 'swimsuits' to determine which yields the fastest lap times.**
- **I will learn to improve the Sphero BOLT's performance as the power source for a water-based vehicle.**
- **I will analyze the effectiveness of my work with supporting facts and reflect on the learning.**

OVERVIEW

The Sphero BOLT is training for a swimming competition but doesn't have a swimsuit. Design one that will help the Sphero BOLT win the race.

MATERIALS

- **Sphero BOLT**
- **Rubber bands**
- **Tape**
- **Stopwatch**
- **Plastic tub**
- **String**
- **Washers**
- **Balloons**
- **Plastic folders**
- **Styrofoam**
- **Glue**
- **Other waterproof craft materials**

EXPLORATION: SWIM!

The Sphero BOLT loves to swim! Check out the video below to see how he races through the water.

▶ *https://youtu.be/UoF52-mboIo*

- *Why do you think the Sphero BOLT moves more quickly through the water with the nubby cover?*

EXPLORATION: TEACH THE SPHERO BOLT HOW TO SWIM

You can help the Sphero BOLT move through the water the same way you control it on land. Watch this video for more driving directions.
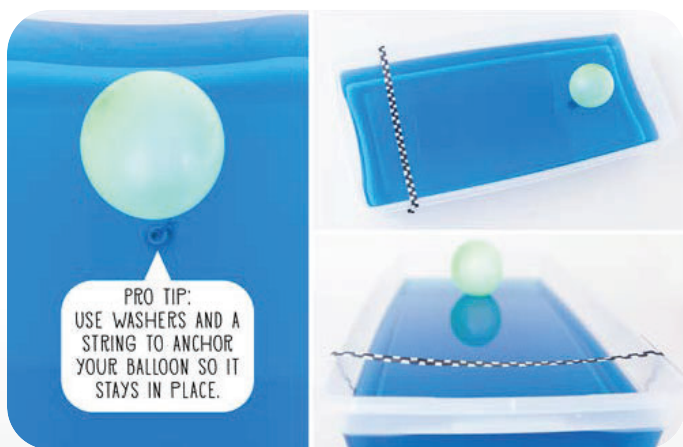
▶ *https://youtu.be/wVkrvIbiKJg*

EXPLORATION: PRACTICE LAPS

Set your swimming pool and practice racing your the Sphero BOLT around the buoy and back.

Answer the following questions:

- *What's it like driving the Sphero BOLT on water? What do you notice?*

- *Is it easy to control? Why or why not?*

- Think about the forces that are pushing and pulling on the Sphero BOLT. *What could you do to help the Sphero BOLT overcome the water resistance and swim faster?*

- Think about how you move through the water when you swim. *What helps move you forward?*

PRO TIP: USE WASHERS AND A STRING TO ANCHOR YOUR BALLOON SO IT STAYS IN PLACE.

WATER RESISTANCE PUSHING BACK AGAINST SPHERO

SPHERO'S MOTOR PROPELLING HIM FORWARD

EXPLORATION: SWIMSUIT DESIGN

Now that you've taught the Sphero BOLT to swim, it's time for a challenge! We're going to see who can design a swimsuit that helps the Sphero BOLT move through water the fastest.

Take a blank piece of paper and fold it in half. Fold it in half the other way so you have four sections. Based on what you know and have learned about how the Sphero BOLT operates in water, draw some ideas of different swimsuits that might help the Sphero BOLT

swim faster. Be creative and don't be afraid to have wacky ideas. Watch this video below if you need a little inspiration.

https://youtu.be/BP2HhTgp7gE

SKILLS BUILDING - EXPERIMENT WITH YOUR DESIGNS

Take a look at each of your drawings and ask yourself:

- *What will I make this swimsuit out of?*

- *How will I make this swimsuit?*

- *What features of this swimsuit will help the Sphero BOLT swim faster?*

Experiment with materials and designs to determine which performs best by using the drive function within the Sphero Edu app. *Which elements should you include in your design?*

Which of your ideas do you think will work the best? Make and test those swimsuits. Remember to record how fast the Sphero BOLT swam while wearing each one.

SKILLS BUILDING: CHOOSE A DESIGN

Think about which swimsuit worked best by asking yourself:

- *Which swimsuit made the Sphero BOLT swim the slowest?*

- *Why did that swimsuit slow the Sphero BOLT down?*

- *Which swimsuit helped the Sphero BOLT swim the fastest?*

- *Why did that swimsuit help the Sphero BOLT go faster?*

- *What could you do to improve your design and make the Sphero BOLT go even faster?*

- Finalize and perfect your design for the big competition.

SKILLS BUILDING: BUILD A PROGRAM FOR YOUR THE SPHERO BOLT

To make the laps in the pool more consistent and less subject to variations when driven, write a program using the Blocks canvas that gets the Sphero BOLT around the buoy and back.

You may have to alter the program when you change the swimsuit design. *Why is that?*

CHALLENGE: SWIM MEET

When all the teams are happy with their designs, start the competition!

1. Have each team show off their best swimsuit by explaining how they designed it and why they think it will help their Sphero BOLT win the race.

2. Time how long it takes for each team's Sphero BOLT to swim across the pool, around the buoy, and back across the finish line.

3. The team with the fastest time wins!

REFLECTIONS

Write your reflections on this activity and discuss with the class.

- *What worked and what didn't?*

- *How would you do things differently in the future?*

- *What happened when you changed the swimsuit design?*