SPHERO CITY

OVERALL TIME *4- to 6-hour lesson*

GROUPS *Three to four kids*

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

CONTENT THEME *Art*

OBJECTIVE

- **I will construct a Sphero BOLT City or a city from history.**
- **I will create a program in the Block Canvas.**
- **I will execute the program using the Sphero BOLT.**

OVERVIEW

Design and construct your own Sphero BOLT City. Build roads, buildings, and all sorts of fun places for the Sphero BOLT to navigate through. Create a program to help the Sphero BOLT get around on its own.

MATERIALS

- **Sphero BOLT**
- **Paper**
- **Tape**
- **Any toys/tools you have**
- **A writing utensil**
- **Cardboard**
- **Space to construct your city**

EXPLORATION: CITY PLANNING

Let's design a city and then learn how to drive your Sphero BOLT through that city. Watch the introduction video below.

▶ *https://youtu.be/j8IHE3ApKkg*

You have two choices for your city design (your teacher may guide you in this area):

- Design your own unique Sphero BOLT City
- Design a city from history

After you've made your choice, think about what you want your city to look like. Begin by drawing a plan or diagram and determine what materials you will need. Conduct research on your city from history, if needed.

Construct your city using any materials and everyday items. Be creative!

EXPLORATION: CREATE YOUR CITY

Construct your Sphero BOLT City using the materials provided and everyday items. You'll be programming your Sphero BOLT to navigate through your city, so make sure your roads and pathways are large enough to fit your robot. You may want to test as you build by driving your Sphero BOLT through the roadways.

SKILLS BUILDING: PROGRAMMING THE SPHERO BOLT

Now that you have built your city, it's time for the Sphero BOLT to take a tour of the town. Navigating the Sphero BOLT through your city is similar to navitating it through a maze.

Watch the video below for an example of a city.

▶ *https://youtu.be/nwOGqm7Gvhg*

- *How far does the Sphero BOLT need to travel for each section? (ex: How far does the Sphero BOLT travel at a speed of 75 for 1 second)*
- *Is each turn 90 degrees or something else? Use a protractor to determine the heading.*

SKILLS BUILDING: NAVIGATE YOUR CITY

Test your program and durability of the city.

- *What worked?*
- *What did not work?*
- *Do you need to improve anything?*

Need inspiration on how to build your city? Take a look at the video below!

▶ *https://youtu.be/IZ49u7-IaAk*

CHALLENGE: CREATE DIRECTIONS

Have the Sphero BOLT make stops along the way. Maybe the Sphero BOLT drives from the Supermarket to the Sandwich Shop. Or, the Colosseum to the Pantheon.

- Determine the Sphero BOLT's path and take measurements of distances and angles.
- Using this data, write down step-by-step instructions for the Sphero BOLT to move through the city.
- **Make at least two stops in your city**, add narrations to your code using the Speak code block.
  - For example, when the Sphero BOLT stops at the Pantheon, the Sphero BOLT describes the Pantheon's purpose in Ancient Rome (use your research skills if needed!). Or, when the Sphero BOLT stops at the supermarket, the Sphero BOLT describes the purpose of that location in the the Sphero BOLT City.
- Use this information to start programming or share the directions with a partner to see if they can program the Sphero BOLT through your city.

Make sure to save your final program!