BLOCKS 1: INTRO & LOOPS

OVERALL TIME *1- to 2-hour lesson*

GROUPS *Three to four kids*

PROGRAMMING LEVEL *Beginning Block: Roll, Delay, Sound, Speak, and Main LED*

CONTENT THEME *Technology & Engineering*

OBJECTIVE

- **I can practice refactoring code.**
- **I can define and use loops.**
- **I can create and execute a Blocks program.**

OVERVIEW

Welcome to your first Blocks activity! This lesson introduces you to the Blocks canvas. Learners will be challenged to create a program using block coding and gain an understanding of loops and operators.

MATERIALS

- **Sphero BOLT**

EXPLORATION: BLOCKS CATEGORIES

The Blocks programming canvas is designed to teach principals of programming. At the bottom of the Blocks canvas you will find 11 block categories. To view the blocks within a category, simply select the category tab.

Category	Description
Movements	Control the robot motors and control system.
Lights	Control the LEDs on your robot.
Sounds	Play sounds or text-to-speech on device.
Controls	Allow conditional or branching logic.
Operators	Math statements to modify or create values.
Comparators	Can compare two values and create conditional logic.
Sensors	Add read-only values streamed from robot's sensors.
Communications	Control a BOLT or RVR's ability to send and receive IR.
Events	Can embed conditional logic in predefined functions.
Variables	Value that limits redundant logic.
Functions	Help organize complex logic.

SKILLS BUILDING: PROGRAM A SQUARE

Follow along with the video below to create a Blocks program. You will program your Sphero BOLT to move in a square with roll and delay blocks.

▶ *https://youtu.be/ZfpPvnEsbto*

SKILLS BUILDING: REFACTORING WITH LOOPS

Now let's refactor your code so that it draws a square using a loop.

- **Refactor** is a common term used by developers that means to improve the way your code is written while still making sure it performs that same action.

You will use a loop to repeat any repeated actions in your original code. A loop repeats a series of blocks as many times as you want.

- *Why would this be useful?*

- *How do loops make it easier to create a shape with five sides, ten sides, or even 100 sides?*

Watch the video below for guided instructions.

▶ *https://youtu.be/6zoXyh5Qoz0*

CHALLENGE: LIGHTS & SOUNDS

Add an extra layer of fun to your program by including lights and sounds as your Sphero BOLT moves in a square. Use the video below if you are unsure how to do this.

▶ *https://youtu.be/x0Iy6eYu6Lg*

CHALLENGE: OTHER SHAPES

How would you change your code to make a different shape?

1. Draw a triangle on a piece of paper. How is it different from a square?

2. Create a new program that has your Sphero BOLT robot move in a triangle. Challenge yourself and see what other shapes you can code.

REFLECTION

Think about the following questions on your own or with a partner:

- *What is a loop?*

- *What are the benefits of refactoring your code to use a loop?*

- *Are there actions you repeat every day? If you could program these actions, how would you write a loop to repeat them for you?*