BLOCKS 4: VARIABLES

OVERALL TIME *1- to 2-hour lesson*

GROUPS *Three to four kids*

PROGRAMMING LEVEL *Advanced Block: Functions, Variables, Complex Controls (If Then), and Comparators*

CONTENT THEME *Technology & Engineering*

OBJECTIVE

• **I can create code from pseudocode.**

• **I can define and use variables, conditionals, loops, random within bounds, and data types.**

• **I can create and execute a Blocks program.**

OVERVIEW

In this activity, you will use variables to build a hot potato game powered by the Sphero BOLT. You will also learn about loop until statements, and randomness within bounds to bring this classic game to life. This is a great activity after you complete Blocks 3.

MATERIALS

• **Sphero BOLT**

• **Paper**

• **Pencil**

WARNING: If the Sphero BOLT is dropped from a distance of more than 36 inches (3 feet or .9 meters) above the ground, it may crack.

EXPLORATION

In this activity, you will create a Hot Potato game with your the Sphero BOLT.

EXPLORATION

Learn the concepts you will use to create this game: loop until and random within bounds.

- *What is a variable?*

- *What is an operator?*

- *What is a loop until statement?*

- *What does random within bounds mean?*

Watch this video to learn how to create the game.

▶ *https://youtu.be/Va-jHqk62-w*

EXPLORATION

Now, write down very detailed instructions for how you might build this game. These instructions are called **pseudocode**.

• **Pseudocode** is a term for the instructions that software developers write BEFORE they write code. By writing pseudocode first, a software developer can make sure the logic for the program makes sense before translating the steps into a language the browser can understand, like JavaScript.

• Be very specific with the pseudocode you write. Imagine you have to give this piece of paper to a software developer. *Do you think they could build this game with your instructions?*

SKILLS BUILDING: VARIABLES

Create your first variables and learn how they will interact with each other to power the game.

Watch the video below to learn about variables.

▶ *https://youtu.be/707A2Yks-40*

SKILLS BUILDING: RANDOMNESS & LOOP UNTIL

Use randomness to make the game unpredictable, and loop until to repeat the game logic until the toss variable is greater than the expire variable.

- *What is the difference between an integer and a float?*

- *What are the bounds you have set for your random integer?*

- *What is the condition that causes the loop to stop?*

▶ *https://youtu.be/3zjWpE-XeBA*

SKILLS BUILDING: IF TOSSED

Create an if/then statement to indicate a toss occurred.

Learn how to create an if/then statement to indicate a toss below.

▶ *https://youtu.be/sl0H_5RUmcA*

SKILLS BUILDING: CONDITION REACHED

When the toss variable is greater than the expire variable, you need to communicate that the player holding the Sphero BOLT is OUT.

Learn how with the video below.

▶ *https://youtu.be/qRU_INLtUeA*

CHALLENGE: LET'S PLAY!

Play the hot potato game with a group friends!

Did the game play as planned? If not, go back to your code to debug and determine what is causing the issue(s). Replay the game after each change you make to the program.

Watch the video below to see how the game is played!

▶ *https://youtu.be/MjqCq3hpSQQ*

CHALLENGE

Now that you've finished building the program, compare your pseudocode to the code you wrote.

- *How close was your pseudocode to the actual code you wrote for the hot potato game?*

- *Where was your logic off?*

REFLECTION

Reflect on what you learned with the Sphero BOLT:

- *How well did your pseudocode match the real code? What differences were there?*

- *What is a variable? Why is it necessary to use variables in a complex program?*

- *What is the difference between the loop, loop forever, and loop until statements? Which did you use in this game?*