LESSONS

OZOBOT BOWL-O-RAMA

OVERALL TIME *60-minute lesson*

GROUPS *- Activity 1: partners*
- Activity 2: groups of three to four

> **Next Generation Science Standards**
>
> *Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.*
>
> *(3-5-ETS1)*

OBJECTIVE

Demonstrate an understanding of programming basics using color-coding.

OVERVIEW

Kids will use programming basics to program a small robot to act as a bowling ball to push down pins.

MATERIALS

- **Ozobots**
- **Markers**
- **Ruler**
- **Paper (plain)**
- **Bowling set**
- **Ozobot Bowling sheet (copies for every kid)**
- **OzoCodes sheet**

KEY TERMS

Ozobot: A programmable robot that follows commands from color-coded paths on paper, as well as computer coding.

Coding: A set of signals called code are sent to a device to provide specific instructions on how to perform an action. With Ozobot, the robot reads the code via colored dots on a piece of paper.

PREPARATION

- Prepare a couple examples of solid lines using the Ozobot colored markers along with an example of a rectangle or other shapes.

- Complete a color-coded Ozobot bowling sheet ahead of time to use for the activity demonstration.

- Make copies of Ozobot bowling sheet (1 per child) and Ozobot Score sheet (1 per group of 3 to 4 kids)
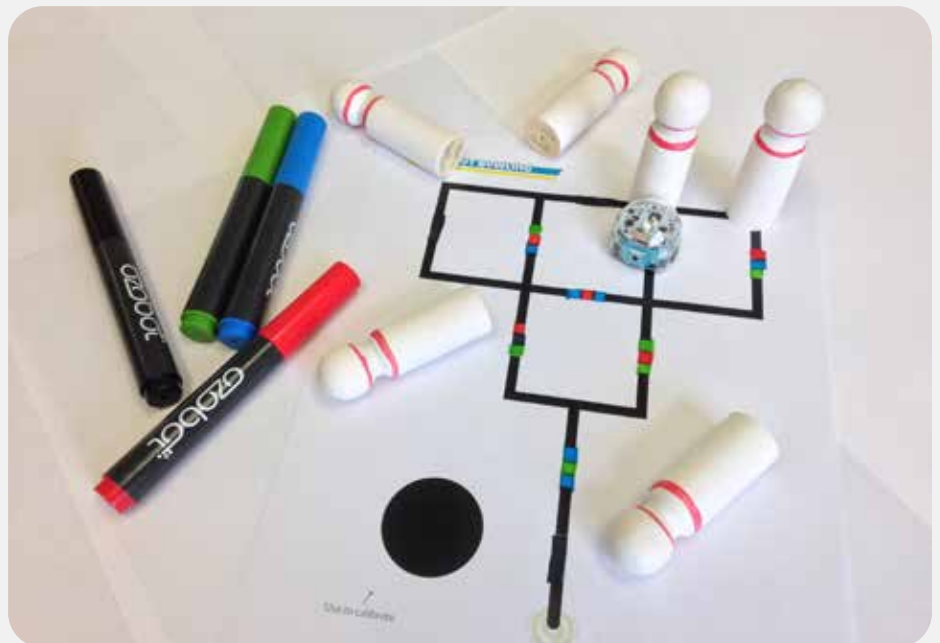
LAUNCH *10 to 15 minutes*

Have kids gather around in a circle. Model programming techniques for the Ozobot using the sheets prepared ahead of time (line and shapes). Make sure to reference how the width of a line and line spacing helps the Ozobot to read the program.

Activity 1 - Color Coding

Have kids partner up to explore creating color-coded programming for the bot with lines and shapes. Kids will need a blank piece of paper and markers for this activity.

Bring the group back together and collect Ozobots. Choose a few kids to share their observations.

The Ozobot bowling sheet is in the resources included with the classroom kit. The OzoCodes sheets are also in the classroom kit. Both can also be downloaded online from: **http://ozobot.com/stem-education/stem-classroom-kit**

EXPLORATION *40 to 45 minutes*

Activity 2 - Ozobot 10 Pin Bowling

Kids are going to take their learning from the color coding activity and apply it to a bowling challenge. They will use color-coding to program the Ozobot to act as a bowling ball to push down pins.

Display an example of a color-coded Ozobot Bowling sheet. Show kids the OzoCode sheet and how it is used to create patterns for speed and turns of the Ozobot. Set up the 10 bowling pins on the bowling sheet. Turn on the Ozobot and let it read the programming. Count how many pins are pushed over, for example, if seven pins are pushed or knocked over, your score would be seven for that round. Write down the score on the score sheet and any additional observations (i.e. if the 2, 3, and 5 pin are left standing up, write it down).

Each child will design an individual Bowling Sheet using the Ozobot Coding Sheet. Provide kids with adequate time to complete an individual color-coded bowling sheet.

When kids finish color-coding, they can make groups of 3 to 4 to start bowling using the Ozobot. Each child will use their individual programming sheet to bowl. Have teams play as many rounds as time permits. The player with the most points at the end is the winner. Teams can keep score on the bowling sheet and make notes under observations of what pins remained standing. The notes can be used later to make changes and programming adjustments.

Clean up materials. Take time for teams to thank each other for being a part of their learning community.

CLOSING *5 minutes*

Have each team respond to the following questions:

- What did you learn about programming the Ozobot from this activity?

- Was there a color-coding pattern that worked better? Why?

- If you had an opportunity to make changes, what would you make, why?

Choose a couple of teams to share their responses with the larger group

ENRICHMENT AND NEXT STEPS

Have the kids design a maze that their peers will have to fill in with OzoCode to get to the end.