

Introduction to Coding With Ozobots

Total Number of Lessons: 5

Total Estimated Time for Module: 5 class periods (250 minutes)

SECTION 1: MODULE OVERVIEW AND CURRICULAR CONNECTIONS – REQUIRED

- **Module goal:** At the end of this module, students will be able to develop a program for a robot to navigate through a maze.
- **Connection to standards:**
 - K-2.CD.1: Use appropriate terminology in identifying and describing computer hardware.
 - K-2.PA.1: Breakdown and plan the order of the steps needed for a desired outcome to accomplish the goal.
 - K-2.PA.2: Using age-appropriate vocabulary, explain steps taken and choices made to improve the design of a sequence.
 - K-2.PA.3: Develop programs with sequences and simple loops to express ideas or address a problem.
 - K-2.PA.4: Identify and fix (debug) errors in sequences and simple loops.
- **RET materials/ideas to be leveraged:** I will be using what I learned about computational thinking and coding to help me develop these lessons.

SECTION 2: OVERVIEW OF MODULE FRAMEWORK – REQUIRED

- **Real-world context:**
 - Robots are machines that use computers to run code in order to function. A human writes the computer code and programs the robot to perform certain tasks. Students will explore Ozobots as examples of simple robots. They will learn that Ozobots have been programmed to perform certain tasks; i.e. follow black lines and special color codes. Students will be able to program these robots to move through a maze, both by following color codes and then later by learning how to use block coding on the computer.
- **Background STEM content:**
 - Ozobots are robots that have been programmed to follow lines and follow simple color codes. They use a color sensor (input) to sense the colors black, blue, red, and green. The sensor sends that information to the processor, which tells the robot how to move (output). Ozobots can also be programmed to move using

computer code that is downloaded from a computer. Students will learn how ozobots collect information (colors) with their sensors and process that information to perform certain tasks. Students will also learn how to create a program on ozoblockly.com to make their robot accomplish a task.

- **Description of Main Activity/Project:**

- Students will begin by exploring Ozobots as line-following robots. Then, students will learn how Ozobots function by collecting color information and performing tasks based on certain color codes.. Next, Students will learn that robots are computing machines that can only perform tasks that they have been programmed to do by a human. Students will begin to explore block coding on ozoblockly.com. For the main project, students will design and build a 3-D maze, and program their Ozobots to successfully navigate through their maze.

SECTION 3: MODULE SEQUENCING AND ASSESSMENT – REQUIRED
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- **Brief description of sequenced learning objectives:**

- Lesson 1: **Intro to Ozobots:** Students will explore Ozobots as line-following robots. They will explore the use of color codes and use color codes to program their Ozobots to navigate simple mazes.
- Lesson 2: **Ozobots as Computing Devices:** Students will identify the inputs (color sensors) and outputs (motor/wheels) of the Ozobots and explain how the Ozobot uses the color codes to “know” what to do. Students will begin to understand “How do computers/robots know what to do?” We will discuss how a computer/robot can only do what it has been programmed to do by a human.
- Lesson 3: **Intro to [Ozoblockly.com](https://ozoblockly.com):** Students will explore the level 1 codes on ozoblockly.com. They will experiment with movement, light effects, and sound codes to create a basic program of their choice, and they will download their programs onto their Ozobots to see how they function.
- Lesson 4: **Design a Maze:** Students will design a simple maze using mazegenerator.net. They will build a 3-D maze using craft sticks and connectors or cardboard.
- Lesson 5: **Code a Maze:** Students will plan steps (algorithm) for how their Ozobots will navigate through their maze. They will write a program on ozoblockly.com to tell their Ozobot how to navigate through the maze. Students will identify bugs along the way and problem solve to debug the problems within their code.

- **Brief description of formative and summative assessment approaches:**
 - After lesson 1, students should be able to explain how Ozobot functions with certain color codes.
 - After lesson 2, students should be able to explain how Ozobot collects color information so it “knows” how to function.
 - After lesson 5, students should be able to demonstrate how their computer program successfully navigates Ozobot through their maze.
- **Recommendations for implementation:**
 - Students will participate in pair-programming throughout these lessons, meaning they will collaborate with a partner to plan, create, and debug their computer programs together.

SECTION 4: MODULE FILES – ENCOURAGED/OPTIONAL

- **List of attached files:** [should include any lesson plans and handouts relevant to the Module, if you have them ready]
 - [Ozobot Introduction to Color Codes Lessons for Grades K-2](#) (need to have an account to access lessons)
 - [Introduction to Color Codes: Basic Training](#)
 - [Introduction to Color Codes: Speed](#)
 - [Introduction to Color Codes: Special Moves and Win](#)
 - [Ozobot Basics](#)
 - [Ozoblockly.com](#)
 - <https://www.mazegenerator.net/>
 - [Sample Maze](#)

