

Unit Overview:

In this unit, students will get familiar with the ROKduino smartblock and the software (Arduino) that is used to program it. Students will gain confidence in their ability to write simple programs that can be uploaded to the ROKduino.

Recommended Grade Level:

4 - 8

Kid Spark STEM Lab:

Engineering Pathways

Alignment to STEM Standards:

The table below highlights how this unit is aligned to the Next Generation Science Standards (NGSS) and the International Society for Technology in Education Standards (ISTE).

- ⚙️ NGSS Disciplinary Core Ideas (DCI) are standards related to content knowledge.
- ⚙️ NGSS Science and Engineering Practices (SEP) and Crosscutting Concepts (CCC) provide a foundation for all scientific and engineering disciplines and are particularly important to develop in young students.
- ⚙️ ISTE standards are designed to prepare students to thrive in a constantly evolving technological landscape. [Click here](#) to view ISTE standards.

Lessons & Assessment	NGSS DCI	NGSS SEP	NGSS CCC	ISTE
Lesson 1: The ROKduino (60 Min.) In this lesson, students will learn how the ROKduino works and how it can be used to control a simple mechanism. Students will also explore the difference between the ROKduino and the Maker ROK-Bot.	Engineering design	Developing & using models	Structure & function	Innovative designer, Computational thinker
Lesson 2: The Arduino IDE & Ardublock (60 Min.) In this lesson, students will learn how to use Arduino software to create a series of simple programs that can be uploaded to the ROKduino. Students will learn how to program the ROKduino to control connected output modules.	Engineering design	Asking questions & defining problems	Systems & system models	Innovative designer, Computational thinker
Lesson 3: Creating a Set of Instructions (60 Min.) In this lesson, students will assemble a maze and attempt to guide a ball through the maze. Then, students will create a set of instructions that can be used to increase efficiency and reduce human error.	Engineering design	Obtaining, evaluating & communicating information	Patterns	Innovative designer, Computational thinker
Lesson 4: Delays & Functions (60 Min.) In this lesson, students will learn how to use delays and create custom functions in Ardublock. Then, students will develop a custom program that can be uploaded to the ROKduino and used to fully automate a maze.	Engineering design	Using mathematics & computational thinking	Systems & system models	Innovative designer, Computational thinker
Lesson 5: Free Build Challenge (60 - 120 Min.) In this lesson, students will apply the knowledge and skills they have acquired throughout the Robotics & Coding 101 unit to develop a custom design or invention.	Engineering design	Planning & carrying out investigations	Scale, proportion, & quantity	Innovative designer, Computational thinker

Unit Assessment: Robotics & Coding 101

In this performance-based assessment, students will complete a series of tasks as they demonstrate their understanding of the core ideas and concepts that were covered throughout this unit.

Target Vocabulary

The following key terms will be used throughout this unit. It may be helpful to explain these terms as they show up in lessons and challenges.

Ardublock - A visual programming tool that simplifies writing sketches by using “blocks” of code.

Arduino IDE - The Arduino Interactive Development Environment (IDE) is software that is used to write text-based programs that can be uploaded to the ROKduino.

Delay - A pause in the execution of a program for a specified amount of time.

Function - A named section of a program that performs a specific task.

Infrared Technology/Signal - Infrared technology uses invisible light to carry signals between a remote control and the device it is controlling.

Microcontroller - A small computer chip that includes input and output ports, a processor, and memory.

Sketch - Programs that are created using Arduino are referred to as “sketches”.



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