Loops & Variables

v2.0

Unit Overview:

In this unit, students will build upon previous Kid Spark robotics and coding experiences as they explore how to use different types of loops and variables in a program/sketch.

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.

Recommended Grade Level:
6 - 8

Kid Spark STEM Lab:
Engineering Pathways

Prerequisite Kid Spark Units:
1. Robotics & Coding 101
2. Exploring Sensors

Note: both of these units can be found in the STEM Fundamentals learning phase (grades 2 - 5).

Lessons & Assessment	NGSS DCI	NGSS SEP	NGSS CCC	ISTE
Lesson 1: While Loops (120 Min.) In this lesson, students will learn how to use while loops to control a simple mechanism. Then, students will build and program a custom design that utilizes a while loop.	Engineering design	Developing & using models	Structure & Function	Innovative designer, Computational thinker
Lesson 2: For Loops (120 Min.) In this lesson, students will learn how For Loops can be used to repeat a set of commands in a sketch. Then, students will build and program a custom design that utilizes a for loop.	Engineering design	Asking questions & defining problems	Systems & system models	Innovative designer, Computational thinker
Lesson 3: Integer Variables (120 Min.) In this lesson, students will learn how integer variables can be used in a sketch as they create a simple counting device. Then, students will build and program a custom design that includes an integer variable.	Engineering design	Developing & using models	Cause & effect: mechanism & explanation	Innovative designer, Computational thinker
Lesson 4: Digital Variables (120 Min.) In this lesson, students will learn how to use digital variables in a sketch to create a toggle switch. Then, students will build and program a custom design that includes a digital variable and a toggle switch.	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 Loops & Variables unit to develop a custom design or invention.	Engineering design	Planning & carrying out investigations	Scale, proportion, & quantity	Innovative designer, Computational thinker
Unit Assessment: Loops & Variables 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.

While Loop - Executes (or loops) a set of commands until the condition of the test is false.

For Loop - Repeats a set of commands a specified amount of times.

Variable - Used to store data that may change during the course of a program/sketch. Variables include a name, data type, and a value.

Integer Variable - A variable that includes an integer data type (whole numbers which may or may not include negative numbers).

Digital Variable - A variable that includes a digital data type (true or false).

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