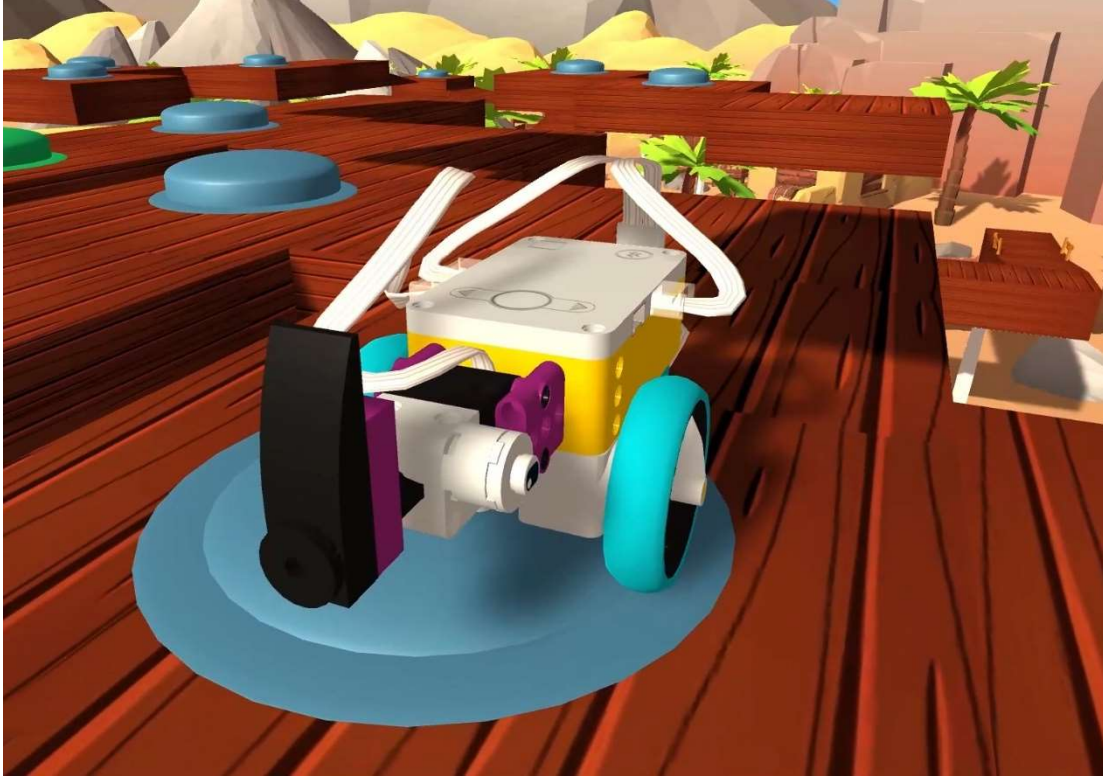


## The New CoderZ Adventure with LEGO® Education SPIKE™ Prime



In this introductory coding course students are introduced to the basic principles of coding within the context of robotics. While participating in a series of increasingly complex tasks students learn about the relationship between hardware and software, the role of mathematical modeling and data in computational problem solving, how basic programming constructs can be combined to create complex algorithms, as well as develop a foundation in key programming practices.

### Standards, Skills, and Concepts

#### CSTA

##### Computer Systems

- 1B-CS-01 Describe how internal and external parts of computing devices function to form a system.
- 1B-CS-02 Model how computer hardware and software work together as a system to accomplish tasks.

##### Data and Analysis

- 1B-DA-07 Use data to highlight or propose cause-and-effect relationships, predicate outcomes, or communicate an idea.

##### Algorithms and Programming

- 1B-AP-08 Compare and refine multiple algorithms for the same task and determine which is the most appropriate
- 1B-AP-10 Create programs that include sequences, events, loops, and conditionals.
- 1B-AP-11 Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
- 1B-AP-13 Use an interactive process to plan the development of a program by including others' perspectives and considering user preferences.
- 1B-AP-15 Test and debug (identify and fix errors) in a program or algorithm to ensure it runs as intended.

##### Impacts of Computing

- 1B-IC-18 Discuss computing technologies that have changed the world, and express how those technologies influence, and are influenced by, cultural practices.

### NGSS

- 3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
- 3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.
- 3-5-ETS1-37 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.

### K-12 Computer Science Framework

#### Computing Systems

- Troubleshooting - Check connections and power to resolve common issues. Explain and demonstrate how rebooting a machine is commonly an effective strategy.

#### Algorithms and Programming

- Algorithms - Compare algorithms and select the one most appropriate for a specific context/task.
- Control - Recognize patterns and effectively use loops to enhance the efficiency of writing code.
- Program Development - Use an iterative process involving design, implementation, and review when developing code.

#### Impacts of Computing

- Social Interaction - Analyze how computing technology's facilitation of communication and innovations influences social institutions such as family, education, and the economy.

### CC Math

#### Mathematical Practice

- MP1 Make sense of problems and persevere in solving them.
- MP2 Reason abstractly and quantitatively.
- MP3 Construct viable arguments and critique the reasoning of others.
- MP4 Model with mathematics.
- MP5 Use appropriate tools strategically.
- MP6 Attend to precision.
- MP7 Look for and make use of structure.
- MP8 Look for and express regularity in repeated reasoning.

### 21st Century Skills

- Creativity and Innovation
- Critical Thinking and Problem Solving
- Communication
- Collaboration

### Computational Thinking Skills

- Decomposition
- Pattern Recognition
- Algorithm Design

### Robotics Concepts and Skills

- Motion Planning - Direction