

Grade 2 Technology Unit 4: Coding

Content Area: **Technology**
Course(s): **Technology Grade 2**
Time Period: **MP4**
Length: **7 days**
Status: **Published**

NJSLS - Computer Science and Design Thinking

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| CS.K-2.8.1.2.AP.1 | Model daily processes by creating and following algorithms to complete tasks. |
| CS.K-2.8.1.2.AP.2 | Model the way programs store and manipulate data by using numbers or other symbols to represent information. |
| CS.K-2.8.1.2.AP.3 | Create programs with sequences and simple loops to accomplish tasks. |
| CS.K-2.8.1.2.AP.4 | Break down a task into a sequence of steps. |
| CS.K-2.8.1.2.AP.5 | Describe a program's sequence of events, goals, and expected outcomes. |
| CS.K-2.8.1.2.AP.6 | Debug errors in an algorithm or program that includes sequences and simple loops. |

Rationale and Transfer Goals

Students will further develop their understanding of computer science using a unit of study developed by code.org. They will learn coding and problem solving through solving various coding puzzles, including how computers can complete some tasks significantly faster than people can without computers. This unit of study will help students understand the basics of how many digital apps, games and programs are created and could inspire them to further their knowledge of the subject as they get older. This unit will allow students to develop their critical thinking and problem solving skills, as well as their collaboration skills on challenging problems.

Enduring Understandings

Computers can be used to quickly solve problems, but they require people to think creatively and be the driving force behind the problem solving.

Essential Questions

How can I program a computer to complete a task?

How can coding affect the speed and efficiency with which the computer completes the task?

Content - What will students know?

- Definition of Program and algorithm.
- Definition of cardinal directions.
- Definition of loops.
- How to combine movement and actions in algorithms.

Skills - What will students be able to do?

- Follow an algorithm to create a pattern.
- Create algorithms to guide a character through a digital maze.
- Use a repeated action or group of actions to solve problems.
- Use loops to move and complete tasks.

Activities - How will we teach the content and skills?

- Large group instruction of graph paper programming, using 4x4 grids to create a pattern from a series of directions, followed by students creating their own algorithms to trade with classmates.
- Whole class instruction of commands to create an algorithm to move a character through a maze, followed by students working through the mazes independently.
- Whole class discussion of actions in a dance that are repeated that can be combined into loops, followed by using loops to streamline their algorithms in the code.org modules.
- Whole class discussion of how to program a robot to move throughout the class and push chairs in, followed by using the combination of movements and actions to move characters through a maze.

Evidence/Assessments - How will we know what students have learned?

- Evaluation of students completed patterns and algorithms.
- Evaluation of students' progress through Programming With Angry Birds and Debugging in Maze.
- Evaluation of students' progress through Loops with Rey and BB-8.
- Evaluation of students' progress through Harvesting Crops with Loops module.

Spiraling for Mastery

| Content or Skill for this Unit | Spiral Focus from Previous Unit | Instructional Activity |
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| How to combine movement and actions in algorithms | Sequential steps in a program | Whole class discussion of how to program a robot to move throughout the class and pushchairs in, followed by using the combination of movements and actions to move characters through a maze. |

Key Resources

code.org course C

BrainPop Jr. (Computer Programming and Loops)

4x4 grid papers

21st Century Life and Careers

WRK.9.1.2.CAP.1

Make a list of different types of jobs and describe the skills associated with each job.

Career Readiness, Life Literacies, & Key Skills

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| TECH.9.4.2.CI.2 | Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a). |
| TECH.9.4.2.TL.1 | Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1). |
| TECH.9.4.2.TL.7 | Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2). |

Interdisciplinary Connections/Companion Standards

Literacy and language arts in the technology context: writing, programming, word processing, and creativity with language

Science: understanding of computer components, operations of touchscreens and other user devices

Social Studies: Computers in the context of society; our relationships to computers as a tool

Health: Limits to screen time and healthy relationships with technology, online technologies

Art: Extensive connections to visual art, design, and multimedia creation through movie-making software

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| SCI.K-2-ETS1-1 | Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. |
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