



Vocabulary:

Algorithm: A list of steps to finish a task. A set of instructions that can be performed with or without a computer. For example, the collection of steps to make a peanut butter and jelly sandwich is an algorithm.

Program: An algorithm that has been coded into something that can be run by a machine.

Sequence: a particular order in which related events, movements, or things follow each other.

Debugging: Finding and fixing errors in programs.

Decompose: Break a problem down into smaller pieces.



Standard 1: Recognize that many daily tasks can be described as step-by-step instructions (i.e., algorithms).

Standard 2: Use an ordered list of steps (i.e., sequential execution) and simple control structures.

Standard 3: Explore how tasks can be decomposed into simple tasks and simple tasks can be composed to form complex tasks.

Standard 4: Develop a program to express an idea or address a problem.



Outside Resource Connections:

- [Sequence in Maze](#)
- [Debugging in Collector](#)
- [How to Introduce Algorithms to Students](#)
- [Introducing Digital Technologies Through Algorithms Unit Plan](#)
- [Algorithms with Khan Academy](#)



Unplugged Activities:

- [Program your friend to draw a picture](#)
- [Debugging Unplugged: Relay Programming](#)
- <https://code.org/curriculum/unplugged>



Tool Suggestions:

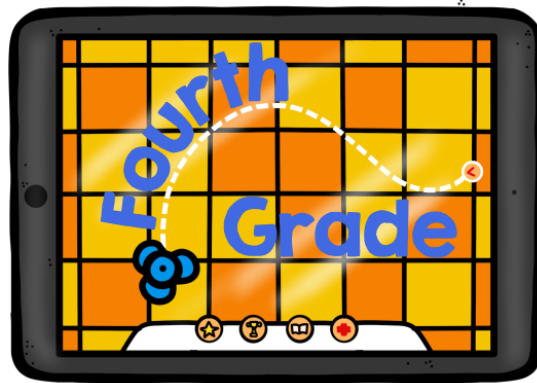
- Legos
- Snap Circuits
- Ozobots



Curriculum Connections:

- Math:
 - Describe daily tasks using analog and digital clocks to record time to the nearest minute and/or time intervals (3.MDA.1)
 - Describe how to add, subtract, or multiply using an ordered list of steps (3.NSBT.2, 3.NSBT.3)
 - Identify a simple task as demonstrating fluency with basic multiplication and division facts. (3.AT0.7)
 - Identify a complex task as determining an unknown whole number in a multiplication or division equation or when solving problems. (3.AT0.4, 3.AT0.8)
 - Use picture directions to design steps for adding/subtracting or multiplying/dividing whole numbers (3.NSBT.2, 3.AT0.1, 3.AT0.2)
 - Test a series of directions by solving addition/subtraction or multiplying/dividing problems. (3.NSBT.2, 3.AT0.1, 3.AT0.2)
- ELA:
 - Write for the domain specific purpose of describing a step-by-step task. (3.W.6.1.b)
 - Create a presentation using photos to describe how to perform a specific task. (3.C.3.2)
 - Discuss the simple tasks that make up the writing process. (3.C.1.2)
 - Identify a complex task (e.g., becoming a published author). (3.C.1.2)
 - Write directions for a simple task using illustrations to aid comprehension. (3.W.2.1.c)
 - develop clear event sequences. (3.C.3.1.a)
- Science:
 - Describe a task as a sequence of steps by using the scientific method. (3.S.1A.3)

- Use picture models to represent the steps and procedures in the scientific method (3.S.1A.3)
- Identify one simple task in a specific scientific investigation. (3.S.1A.3)
- Identify a complex task (e.g., lighting a bulb is a complex task of the path of an electric current). (3.S.1A.3)
- Draw picture directions to describe the path of an electric current in a complete simple circuit as it accomplishes a task. (3.S.1A.3)
- Use the scientific method to perform a specific scientific investigation to test a series of directions to successfully complete a simple task (e.g., determine the factors that affect the strength of an electromagnet). (3.S.1A.3)
- Social Studies:
 - Describe the sequence of steps necessary for the planting, cultivation, and harvesting of rice in the Carolina colony. (3-2.4 3-2.5)
 - Use picture models to represent the process of removing seeds from cotton using the cotton gin. (3-4.2)
 - Identify the simple tasks that comprised the planting of rice in the Carolina colony. (3-3.1)
 - Identify complex tasks that led to the American Revolution. (3-3.1)



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Sequence: a particular order in which related events, movements, or things follow each other.

Bug: An error in a program that prevents the program from running as expected.

Debugging: Finding and fixing errors in programs.

Decompose: Break a problem down into smaller pieces.

Function: A piece of code that you can easily call over and over again. Functions are sometimes called 'procedures.'

Loop: The action of doing something over and over again.

Repeat: To do something again.



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Outside resource connections:

- [Sequences in Mazes](#)
- [Debugging in Scrat](#)
- [Introduction to Online Puzzles](#)
- [Functions in Artist](#)
- [Functions in Bee](#)
- [Functions in Farmer](#)



Unplugged Activities:

- [Algorithms: Dice Race Unplugged](#)
- [Functions: Songwriting Unplugged](#)



Tool Suggestions:

- Legos
- Snap Circuits
- Ozobots



Curriculum Connections:

Math

- Use step-by-step instructions to illustrate and explain calculations. (4.NSBT.5 4.NSBT.6)
- Reorder a sequence of steps indicating how to fluently add and subtract multi-digit whole numbers. (4.NSBT.4)
- Recognize that steps can be ordered in different ways, such as composing and decomposing a fraction in more than one way. (4.NSF.3)
- Compose simple tasks into complex tasks, such as using basic multiplication/division facts to multiply and divide multi-digit whole numbers. (4.NSBT.5 4.NSBT.6)
- Decompose a complex task into simple tasks, such as explaining why a fraction is equivalent to another fraction. (4.NSF.1)
- Use picture directions to design a series of steps when composing/ decomposing a fraction in more than one way. (4.NSF.3)
- Test a series of directions to add/subtract mixed numbers with like denominators. (4.NSF.3)

ELA

- Write narratives that develop real experiences using clear event sequences. (4.W.3.1.a)
- Write informative texts that use illustrations to clarify a sequence of steps. (4.W.2.1.d)
- Write narrative text that organizes the individual steps of the writing process into one cohesive complex task. (4.W.3.1.c)
- Write narrative text that breaks down a complex task into simple tasks using clear sequencing. (4.W.3.1.c)
- Use illustrations in informational text to clarify the steps of annotating a poem. (4.W.2.1.d)

Science

- Perform a scientific investigation. (4.S.1A.3 4.P.4A.5 4.P.4B.1)
- Identify the procedures within a scientific investigation and analyze which steps can be reordered with a picture model. (4.S.1A.3 4.P.4A.5 4.P.4B.1)
- Identify the procedures within a scientific investigation and analyze which steps can be reordered. (4.S.1A.3 4.P.4A.5 4.P.4B.1)
- Compose the steps of the water cycle. (4.S.1A.3 4.E.2A.2)
- Decompose the life cycle of an animal or plant. (4.S.1A.3 4.L.5A.3)
- Use picture directions to design a scientific investigation. (4.S.1A.3 4.P.4A.5 4.P.4B.1)
- Test a series of directions within a scientific investigation. (4.S.1A.3 4.P.4A.5 4.P.4B.1)

Social Studies

- Use step-by-step instructions to explain the purpose, location, impact, and sequence of key United States land acquisitions in the first half of the nineteenth century. (4-5.3)
- Compose the various tasks of the three branches of government associated with creating a law. (4-2.2)
- Decompose the process of creating a law into the various tasks associated with the three branches of government. (4-4.2)

- Use picture directions to design a series of steps necessary to illustrate the process of creating a law. (4-4.2)



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Function: A piece of code that you can easily call over and over again. Functions are sometimes called 'procedures.'

Data: Information. Often, quantities, characters, or symbols that are the inputs and outputs of computer programs.

Condition:

Conditional Statement: Statements that only run under certain conditions or situations.

Loop:

Repeat:



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Outside resource connections:

- [Sequences in Mazes](#)
- [Debugging with Scrat](#)
- [Programming in Artist](#)
- [Introductions to Online Puzzles](#)
- [Functions in Bee](#)
- [Functions with Parameters in Artist](#)
- [Functions with Parameters in Bee](#)
- [My Loopy Robotic Friends](#)
- [Loops in Artist](#)
- [Nested Loops](#)
- [Nested Loops with Frozen](#)



Unplugged Activities:

- [Programming: My Robotic Friends](#)
- [Algorithms: Tangrams](#)
- [Functions: Songwriting with Parameters](#)
- <https://code.org/curriculum/unplugged>



Tool Suggestions:

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Curriculum Connections:

Math

- Multiply multi-digit whole numbers using a standard algorithm. (5.NSBT.5)

- Recognize that a sequence of steps can be repeated such as those in multiplying multi-digit whole numbers when using a standard algorithm. (5.NSBT.5)
- Identify the result of a conditional statement when classifying two dimensional figures. (5.G.3 5.G.4)
- Decompose a complex task of higher complexity into simple tasks such as justifying the reasonableness of a product when multiplying with fractions. (5.NSF.5)

ELA

- Compose multiple levels of simple tasks into complex tasks, such as using the concept of multiplication to multiply a fraction or whole number by a fraction (5.NSF.4)
- Organize simple tasks into natural sequences when writing narrative texts that describe complex tasks. (5.W.3.1.c)
- Write a narrative that decomposes a complex task into simple tasks that follow a clear event sequence. (5.W.3.1.a)

Science

- Execute a controlled scientific investigation. (5.S.1A.3 5.P.5A.3)
- Recognize the sequence of events in a controlled scientific investigation can be repeated. (5.S.1A.3 5.P.5A.3)
- In a scientific investigation, identify the result of a conditional statement.(5.S.1A.3 5.P.5A.3)
- Compose multiple levels of simple tasks in the scientific investigation can be made into a more complex task or solution. (5.S.1A.3 5.P.5A.3)
- Decompose a solution from a scientific investigation into simple tasks. (5.S.1A.3 5.P.5A.3)
- Identify a problem within a scientific investigation that allows for a solution that can be outputted through a visual language design. (5.S.1A.3 5.P.5A.3)

Social Studies