



Integration Opportunities

Math 4.NS.2a Decompose the process for comparing large numbers into smaller steps, design multiple algorithms to compare the numbers using place value or other methods, and compare the numbers using both mathematical symbols and words.

Science 4.3b Given a specific food web of an ecosystem, identify various food chains included within the food web..

Physical Education 4.1a Have students work in groups to decompose movement skills into smaller elements (including force and speed) and identify patterns within these skills. Then have students demonstrate which combination of skills is most effective at performing a specific task.

Music 4.3c Given various musical compositions from different cultures, identify features of the compositions and describe patterns noticed in those features.

4.AP.1 Algorithms and Programming

The student will apply computational thinking to identify patterns and design algorithms to compare and contrast multiple algorithms used for the same task. (a) Decompose an algorithm, process, or problem into a subset of smaller problems. (b) Identify multiple algorithms for the same task. (c) Describe patterns within multiple algorithms. (d) Determine which algorithm is most effective for a given task.

Understanding the Standard

Computational thinking involves four components: decomposition, pattern recognition, abstraction, and algorithm design. In fourth grade, students should be further practicing and strengthening their skills in categorizing, decomposing, and identifying patterns. Students can analyze and evaluate programs by breaking down large problems into subproblems. Breaking down a large problem or task into smaller, more manageable chunks is called program decomposition. Decomposition helps in developing a program by allowing team members to focus on one part of the problem at a time or work on different parts of a program at the same time and add the smaller components together to complete a task.

Term	Definition
Algorithm	A list of steps to finish a task.
Attribute	Characteristic or physical description of an object (color, shape, size).
Pattern	A predictable, repeated sequence of objects or events.
Decompose	Breaking a complex problem into parts that are easier to understand and solve.
Subproblem	A smaller problem that is part of a larger problem.

Prerequisite Knowledge

To engage with this standard, students should have experience using graphic organizers such as mind maps or flow charts. Students will also draw on experiences following step by step instructions and delegating group responsibilities.

Summary of a Lesson

In pairs or groups of three, students will use Scratch to create an animated story retelling a familiar fairy tale. The students will decide which story to tell and will need to determine each part necessary to create the story including characters, scenes, actions and sequence. Each story element will continue to be broken down into smaller and smaller parts until all aspects of the story are present. Problem/Solution charts may be used to organize and test ideas. Students can delegate tasks and peer review as the story is created.

