

1.AP.1 Algorithms and Programming

The student will apply computational thinking by sorting items into categories based on multiple attributes and creating patterns. (a) Describe attributes of a set of objects. (b) List the attributes a set of objects have in common. (c) Sort and classify concrete objects based on multiple attributes. (d) Create repeating and increasing patterns.



Integration Opportunities

Understanding the Standard

This standard introduces students to computational thinking as a problem-solving approach in computer science. Computational thinking involves four components: decomposition, pattern recognition, abstraction, and algorithm design. Building on their practice of sorting by a single attribute in Kindergarten, first graders will sort items based on multiple attributes. Attributes may be visual (color, shape, size), textural, or even based on movements, like rolling, sliding, turning, or stopping. First graders will also build upon their abstraction skills (focusing on important attributes and ignoring irrelevant characteristics) and use pattern recognition skills by using objects from different groups to create both repeating and increasing patterns.

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.

Prerequisite Knowledge

Students need experience sorting items based on at least one attribute to engage with this standard. It is also helpful to establish a basic vocabulary of adjectives to support student descriptions of attributes.

English 1.FFW.2c Have students identify, sort, and encode unfamiliar words with the same word pattern.

Math 1.MG.2 Identify multiple ways to sort and classify concrete objects into appropriate categories based on similarities and differences or as examples and non-examples.

History 1.8 a & b Have students sort goods from services and producers from consumers.

Physical Education 1.1 h Students might create and perform repeating and increasing rhythmic patterns using movements or poses.

Summary of a Lesson

As a class, examine sets of objects and decide what all of the objects in the set have in common. Define *attribute*, and list the common attributes for each set. In partners, have students sort buttons based on teacher-provided combined categories (round and 2 holes, round and 4 holes, not round with 2 holes, not round with 4 holes, etc.). After sorting each partner should design a pattern using the sorted buttons. Have partners discuss their patterns and identify if the pattern repeats or increases, then facilitate a gallery walk for students to share their patterns with their classmates. This lesson can be modified to include collecting concrete objects, pictures, or manipulatives.