Looking for patterns and structures and organizing information (including classifying) are crucial mathematical processes used frequently in mathematical thinking and problem solving. They also have been viewed as distinct content areas in early childhood mathematics learning. Such pattern “content” usually focuses on repeated patterns, such as abab or abcabc, that are done with colors, sounds, body movements, and so forth (such as the bead and block patterning examples discussed in the section on unitizing). Such activities are appropriate in early childhood and can help to introduce children to seeing and describing patterns more broadly in mathematics. The patterns abab, abcabc, and aabbaabb can be learned by many young children, and many children in kindergarten can do more complex patterns (Clements and Sarama, 2007). Learning to see the unit in one direction (from left to right or from top to bottom or bottom to top) (ab in abab, abc in abcabc) and then repeating it consistently is the core of such repeated pattern learning. Learning to extend a given pattern to other modalities (for example, from color to shape, sounds, and body movements) is an index of abstracting and generalizing the pattern.

Counting involves some especially important patterns that go beyond simple repeating patterns. For example, the pattern of counting is a critical idea in number. The list of counting numbers has an especially important and intricate pattern, which involves a coordinated cycling of the digits 0 through 9 in the ones, tens, hundreds, etc., places (see Box 2-2). Although this intricate pattern will not be fully understood by children until later in elementary school, the foundation for this understanding is laid in early childhood as they identify and use the repeating patterns in the number words to 100.

Organizing information, including classifying, has also been seen as early childhood mathematics content, as children use attribute blocks and other collections of entities in which attributes are systematically varied so that they can sort them in multiple ways. Attribute blocks usually vary in color, shape, size, and sometimes thickness, so that children can sort on any of these dimensions and also describe a given block using multiple terms. For example, in small groups, a teacher may first ask children to sort the blocks on one or two dimensions: “Find all the big blue blocks.” As children become more proficient, the teacher adds challenge, such as “Find the small blue thin rectangle.” Later on, in preschool and in kindergarten, the teacher may ask children to generate their own descriptions of how groups of blocks are similar and different.

Recognizing patterns and organizing information are part of recognizing structure. At all levels in mathematics, one looks for structure. Some experiences in recognizing structure can be part of a foundation for later algebraic thinking. For example, recognizing that if there were 3 birds and then 2 more birds flew in versus if there were 2 birds at first and then 3 more birds flew in results in the same total number of birds either way is a step toward recognizing the commutative property of addition, that a + b = b + a for all numbers a and b.

Although these content examples of looking for patterns and structures and organizing information are appropriate activities, they form a small part of the mathematics content for early childhood. Similarly, the specific skills in these examples are but a small part of the role that these processes play in mathematics.