Professional Learning Module
Mathematical Thinking: Rethinking Calendar Time

Big Ideas of Patterns

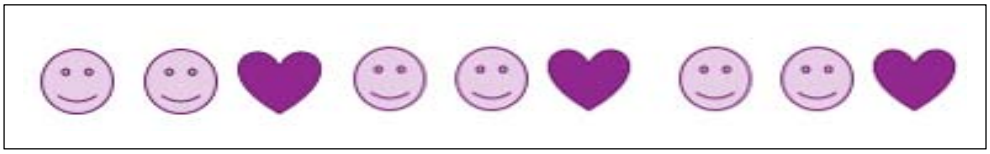
Patterns are all around us. Children look for and know patterns. They know that bath time comes after dinner, we are in school five days then home two, etc. The human brain is predisposed to patterning, to find similarities that bind seemingly unrelated information together as a whole.

Without recognition of pattern, children would experience all events as discrete, separate and unrelated. Children crave regularity because it allows them to predict what comes next and make sense of their world.

Children are able to detect patterns in their world and know when the rule has been violated – think of children's protests when your daily schedule deviates from the normal routine – long before they are able to create their own stable patterns. The search for pattern underlies all learning and makes a particularly powerful contribution to our mathematical understanding. Virtually, all mathematics is based on **pattern and structure**.

Children need many opportunities to discover and talk about patterns in mathematics. These experiences help them form the attitude and confidence that mathematics should make sense – the crucial foundation all children need in order to become persistent and flexible problem solvers. Since patterns are all around us, you will find that teaching opportunities arise naturally and frequently, and not just at "math" time.

Repeating patterns are often the first kind of pattern that young children recognize and label as patterns. When we think of patterns, what often comes to mind are sequences that repeat such as red, white, blue; red, white, blue; red, white, blue; etc. Repeating patterns contain a segment that continuously repeats. We call this segment the **unit of repeat.** A unit of repeat can vary in length and level of complexity but it is always the shortest string of elements that repeats – it is **the rule** that governs a pattern.



Children will begin to learn that patterns have rules and can define the rule of pattern when asked to define the pattern. A child who can say, "I know the next color will be…because…" knows the rule. They are able to predict what will come next in the pattern based on what was happened so far. Children who are never asked to identify the rule of patterns will have difficulty extending patterns, especially as they become more complex. Knowing the rule, allows one to predict what comes next. Children need diverse experiences with repeating patterns.

The search of a pattern is a habit of mind we want to encourage in all young mathematicians. Children must see all mathematics as a search for patterns, structure, and relationships, as a process of making sense of physical, geometric, and eventually numerical, situations – the foundation for algebraic thinking.

Source: *Big Ideas of Early Mathematics* Chapters 5; Early Math Collaborative; Erikson Institute, Pearson Education, Inc. 2014