

Unit 2 Research



Developing an understanding of numbers and how to represent them is a major mathematical task for kindergarten children. Numbers are abstractions that apply to a broad range of situations (Example: five children, five fingers, five years old, five apples, five o'clock). It is necessary for children to memorize the number sequence in order to count objects. Children in Starfall Math classrooms have many opportunities to count in unison by ones, fives, and tens, to sing counting songs and nursery rhymes, to count items in a set, and to count on from a given number.

In learning about numbers, the key connection children must make is the one-to-one correspondence between numbers and the number of objects in a set.⁽¹⁾ Children begin to understand and create sets in relation to more than, less than, and equal to. They gradually develop strategies for matching the objects in sets to determine which has leftover objects, or they count both sets and use their understanding of more/less than to compare the sets.

Engaging kindergarten children in number activities and simple games (such as board games) that emphasize one-to-one correspondence, counting, and moving along a number path are important for strengthening foundations and building conventional number knowledge.⁽²⁾ Many activities on Starfall.com directly reinforce classroom math lessons.

Another crucial mathematical process is pattern. Recognizing and using patterns is a valuable problem solving and mathematical thinking skill for young children. They need to experience patterns visually, auditorily, and physically.⁽³⁾ Starfall Math's pattern activities focus on repeated patterns such as *abab*, *aabbaabb*, and *abcabc* using colors, sounds, and body movement. Children learn to analyze, duplicate, extend, and describe many different patterns.

Patterns are not taught as a unit, but integrated throughout the Starfall curriculum across many units.

(1) Committee on Early Childhood Mathematics (2009). *Mathematics Learning in Early Childhood: Paths toward Excellence and Equity*. Washington, D.C.: National Academies Press.

(2) Klibanoff, R.S., Levine, S.C., Huttenlocher, J., Visilyeva, M., and Hedges, L.V. (2006). Preschool children's mathematical knowledge: The effect of teacher "Math Talk". *Developmental Psychology*, 42(1), 59-69.

(3) Clements, D.H., and Sarama, J. (2007). Early childhood mathematics learning. In F.K. Lester, Jr. (ed.), *Second Handbook of Research on Mathematics Teaching and Learning* (pp. 461-555). New York: Information Age.

Unit 2 Frequently Asked Questions

Why does Starfall Math include patterns in its curriculum? Patterns are not a Common Core Standard.

Patterns serve as the cornerstone of algebraic thinking. Children watch the sun setting every day. They listen to stories, songs, and verses that follow patterns. They notice how a kitten alternates between play and sleep. They jump rope to patterned chants, and skip over sidewalk bricks laid in patterns. Recognizing, describing, extending, and translating patterns encourages children to think in terms of algebraic problem solving. Working with patterns requires young children to identify relationships and form generalizations.

By comparing objects to one another and understanding the relationship between pairs of objects, children demonstrate the ability for transitive thinking. (Example: If Lucas is taller than Olivia, and Olivia is taller than Emma, then Lucas is also taller than Emma.)

Children's understanding of mathematical relationships develops over time. By describing and working with patterns in the world around them, they are using ideas that are foundational to algebraic thinking.

Why does Starfall include so many lessons dealing with more than and less than?

Children learn to count by rote. Educators (and others) often mistakenly assume that because children can count to 20 easily that they understand the sequence of numbers. Throughout the curriculum Starfall provides opportunities for children to practice the meaning of counting and to recognize the quantity the numbers represent.

The fact that children are usually more successful at determining which number is "one more" than which number is "one less" is an indication that they do not fully comprehend the meaning of numbers. Therefore, Starfall integrates opportunities throughout the math curriculum for children to demonstrate understanding of the number system by requiring them to determine which number is one less than another. These opportunities occur primarily during the Magic Math Moments.