

# Unit 1 Research



As young children learn to describe and represent quantities, shapes, space, and patterns, they gain insights and ideas for understanding the world. Evidence shows that learning mathematics is vital for children's early years and for later success in mathematics, as well as increased overall academic success in such areas as literacy, science, and technology.<sup>(1)</sup> Starfall Math is designed to help children see relationships and interconnections in mathematics. Each unit is a building block for future units.

In 2006, NCTM (National Council of Teachers of Mathematics) released Curriculum Focal Points for pre-kindergarten through grade 8 mathematics. At the kindergarten level, the three focal points include numbers and operations, geometry, and measurement.<sup>(2)</sup> It is crucial that sufficient time is devoted to mathematics instruction in kindergarten so that children develop the foundational mathematical skills and understanding described here. Time must be allocated not only for the more formal parts of mathematics instruction and discussions that occur in the whole group or small groups, but also for children to elaborate and extend their mathematical thinking by exploring, creating, playing in learning centers, and completing computer activities.<sup>(3)</sup> Effective whole group interactions include brief demonstrations and discussions, problem solving in which children partner to talk and work together, and physically active activities such as marching around the room while counting, acting out nursery rhymes that include counting, and acting out patterns and graphs.

Children in a Starfall Math classroom learn that with the combination of only 10 numerals (0 through 9), they can write any number, no matter how large. They begin to understand that the meaning of a numeral in a written number depends in a very specific way on its placement. They actively participate in creating larger and larger units of numbers by bundling them together to create groups of 10.

Research reveals that the use of open-ended questions increases math talk in the classroom. Effective teachers ask children "Why?" and "How do you know?"<sup>(4)</sup> Starfall's Magic Math Moment and math lessons provide experiences that allow children to share strategies, explain their thinking, work together, and listen to each other to solve problems.

Morning math routines, in which students gather together on a rug or carpet to interact, help enhance math instruction.<sup>(5)</sup> The activities are designed to build number sense in students, therefore it is important that students are in control and have the opportunity to demonstrate their understanding and proficiency in number operations. Posting the date on the calendar, adding a craft stick to count school days, predicting the day's weather, and other similar activities help children develop real-life math skills and reinforce the base ten number system throughout the 180 days of the school year.

(1) Duncan, G.J., Dowsett, C.J., Claessens, A., Magnuson, K., Huston, A.C., et al, (2007). "School Readiness and Later Achievement," *Developmental Psychology*, 43(6), 1428-1446.

(2) National Council of Teachers of Mathematics (2006). *Curriculum Focal Points for Pre-Kindergarten through Grade 8 Mathematics: A Quest for Coherence*. Reston, VA.

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

(4) 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, NY: Information Age.

(5) McCoy, A., Barnett, J., and Combs, E., (2013). *High-Yield Routines for Grades K-8*. National Council of Teachers of Mathematics.

# Unit 1 Frequently Asked Questions

## **What is the primary focus of the Starfall math curriculum?**

Number sense is the primary focus of the Starfall Math curriculum. Number sense is the foundation for children's later mathematical achievement. Many preschool children can mechanically count, or even add and subtract as a result of practice and drill, yet they hardly understand the meaning of numbers or their relationships. In other words, children "do" math without understanding numbers. The Starfall Math curriculum focuses on number sense, involving the understanding of whole numbers, number operations, and number relations. In order to navigate formal mathematics, children must be able to link their basic understanding of numbers to symbolic representations. Early number competencies influence future success in mathematics. As number sense is being developed, geometry, algebraic reasoning, and measurement are integrated and spiraled throughout the curriculum.

## **Why is the Daily Morning Routine so important?**

The Daily Morning Routine includes the following five components, which demonstrate the use of numbers in everyday life and provide daily exposure to cardinality.

1. **Calendar Routine** — The Calendar Routine provides practice in ordering numbers, reading a graph, adding "one more," creating equivalent sets, ordinal numbers, coin values, and the list goes on!
2. **Weather Routine** — The Weather Routine provides experience with a different way to graph numbers through the use of tally marks. Children learn and practice predicting, estimating, greater than, less than, equal, and probability as they chart the daily weather.
3. **Number Line Routine** — The Number Line Routine establishes, at an early age, that numbers do not begin at zero but are infinite in both directions (positive and negative). The premise is that children will use the number line as one way to chart how many days they have been in school. Its uses are unlimited: counting forward from a given number; counting backward from a given number; skip counting by 2s, 5s, 10s, 25s, 50s; ordering numbers; and adding one more.
4. **Place Value Routine** — The Place Value Routine is linked to the Number Line Routine, and is probably the single most important routine in which children learn from a very young age that our number system contains only the digits 0 through 9 and that regrouping is necessary to form additional numbers. Children "bundle" every ten days, which helps to set the stage for understanding place value.
5. **Hundreds Chart** — The Hundreds Chart also reinforces number order and intuitively creates a visual that demonstrates how numbers are organized by groups. It provides another experience in charting numbers.