The Link Between Early Literacy and Numeracy Skill Development
Introduction

While early literacy and numeracy skills are normally thought of as separate areas of instruction for educators, research suggests there are important cognitive connections between early literacy and numeracy skill development.

Both skill sets are critical for early school success, and there is a growing body of evidence that both early literacy and early numeracy skills are strong predictors of children’s long-term achievement (Duncan et al., 2007; Watts, Duncan, Siegler, & Davis-Kean, 2014). One of these studies was released in *Developmental Psychology* and analyzed data from six studies to estimate that early math skills have the greatest predictive power of later achievement, followed by reading and attention skills.

Just as a strong connection between literacy and numeracy can lead to positive outcomes, research also shows that young children with developmental delays in literacy skills are often delayed in early math skills as well (Krajewski & Schneider, 2009).

As educators continue to use their valuable resources and class time to create a strong foundation for future reading and mathematical skill development, it’s important to recognize the dependencies between these two areas to think holistically about a student’s early education.

Learn how early literacy and numeracy skills can create a strong foundation for future reading and mathematical skill development in this white paper.
The Importance of Math Education

According to the International Commission on Mathematical Instruction, “mathematics is a fundamental part of human thought and logic, and integral to attempts at understanding the world and ourselves.”

While literacy is rightfully considered the foundation for all learning that extends to all academic areas of a student’s education, early math achievement is critical for placing children on a positive educational trajectory. In fact, children who start behind in mathematics tend to stay behind throughout their entire education (Duncan et al., 2007; Jordan, Kaplan, Ramineni, & Locuniak, 2009; Stock, Desoete, & Roeyers, 2010; Toll, Van der Ven, Kroesbergen, & Van Luit, 2011).

It’s often assumed that the strength of early reading skills such as phonological awareness, phonics, orthography, and morphology are the strongest predictors of future school achievement. In reality, research has shown that early math achievement actually has stronger predictability factors for both later achievement and reading achievement (Duncan et al., 2007, Duncan & Magnuson, 2011; Koponen, Salmi, Eklund, & Aro, 2013).

For all of these reasons, educators across the country are beginning to shift their curriculum to have a stronger focus on math. This strategy has not only demonstrated a direct increase in literacy skills, but it has also shown that children receiving an intensive mathematics curriculum outperformed those receiving typical district mathematics instruction on measures of key word recall, grammatical complexity, independence of narrative retell, and inferential reasoning. (Sarama, Lange, Clements, & Wolfe, 2012).
The Connection Between Reading to Math

As students progress from simple math concepts to more advanced, they will be required to fluctuate between word problems and mathematic formulas. They’ll have to carry out numeric calculations and in turn interpret their results using the context and language of the word problem. As a result, they must be able to communicate their answers using correct mathematical language, both as numbers and in sentence form.

If a student cannot achieve the first step of being able to read a word problem, interpret the language correctly, and understand what the question is asking them to calculate, it will be near impossible for that student to succeed. A strong knowledge and foundation of vocabulary must be present for students to even begin the process of securing basic mathematical skills.

All of this boils down to one simple statement: Improving a student’s literacy will help them build connections between concepts, terminology, skills, and representations, which contributes to this idea of the development of mathematical literacy.

Mathematical literacy is defined as “an individual’s capacity to formulate, employ, and interpret mathematics in a variety of contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts, and tools to describe, explain, and predict phenomena. It assists individuals to recognize the role that mathematics plays in the world and to make the well-founded judgements and decisions needed by constructive, engaged, and reflective citizens” (OECD, 2018, pg. 67).

Furthermore, research has continued to illustrate the undeniable influence language and numeracy have on each other. There are some specific connections called out in this research:

- Connections between children’s knowledge of number words and knowledge of language quantifiers such as a, some, and all (Negen & Sarnecka, 2012)
- The ability of a child to define specific words has been associated with a range of numeracy skills in kindergarten
- The ability to identify letter names and sounds, rhyming, and knowledge of print concepts have connections with specific early numeracy skills
- Strong correlation between letter and number naming in preschool (Piasta, Purpura, & Wagner, 2010)
- Letter knowledge and rhyming predicted a child’s ability to subtract and add (Davidse, Jong, & Bus, 2014)

The research is clear: Early numeracy and literacy are undeniably linked.
Incorporating Math into Your Everyday Classroom Reading

Cultivating a robust language environment for your students is the first step to supporting the reading and math connection. This often begins at home—the more language and vocabulary a child is exposed to in their preschool years from caregivers, the easier their transition will be throughout early education. One study concluded that consistent math language used by preschool was related to children’s growth in mathematics over the course of the year (Klibanoff, et al., 2006). Language is the key needed to unlock literacy and numeracy skill development. As children develop key language skills, they are laying the foundation for the crucial skills they’ll use for the rest of their lives.

An easy way to bring a mathematical focus to your classroom’s reading program is to select books that embed mathematical dialogue, themes, or concepts (Hojnoski, Columba, & Polignano, 2014). Following the reading, a mix of vocabulary and math activities can be alternated to support the learnings from the overall lesson and book. Not only are you promoting numeracy development, but you’re doing so while simultaneously addressing the development of necessary literacy skills.
Whether you’re a teacher, curriculum director, or administrator, you work tirelessly to help create positive outcomes for your students.

We want to empower you as a leader in your school and classroom by providing the tools you need to assess your students’ developing numeracy skills and intervene accordingly. We’re here to help.

Providing a holistic offering of reading, writing, and math interventions and assessments, Voyager Sopris Learning® has solutions that help educators create strong, sustainable foundations to ensure academic success for all students.

**Acadience Math | Grades K–6**

*Acadience Math*® is a universal screening and progress-monitoring assessment that measures the acquisition of mathematics skills. Composed of measures of early numeracy, computation, and problem solving, these assessments give educators a quick-and-efficient way to monitor progress, tailor instruction, and guide students toward math proficiency.

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*Vmath*® Third Edition is a targeted math intervention program for struggling students that provides additional opportunities to master critical math concepts and skills. Vmath delivers essential content using strategies proven to accelerate and motivate at-risk students.

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References


