

Frog Street Early Childhood Curriculum

*Theoretical and Evidential Research of the
Frog Street Continuum*



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Theoretical Research Base and Application

The Frog Street curriculum continuum is a teacher-driven curriculum with a dedication to continually improving state-of-the-art products and services based on current research and early childhood expertise from classroom educators and caregivers. Frog Street products and services are well-grounded in a deep knowledge of child development, school readiness needs and essentials for successful implementation. Frog Street is uniquely positioned to empower educators to know not only what to teach but also the how and why of innovative instructional strategies to improve school readiness and sustain program effectiveness.

The continuum of Frog Street curriculums supports the optimal development of children from birth through five years old. Each curriculum is developed with key research cornerstones to provide rich activities that optimize learning and development for young children. The cornerstones include: 1) Responding to Early Brain Development Research, 2) Supporting Learning Domains, 3) Integrating Strong Social Emotional Development with Conscious Discipline®, and 4) Ensuring Intentionality to Meet the Needs of All Learners.

1) Responding to Early Brain Development Research

The first years of life lay the foundation for lifelong learning. The child's brain is busy wiring the foundation for vision, emotional stability, social interactions, language development, motor development, thinking skills, and much more. By age three, a child's brain has achieved 80% of its wiring foundation. By age five, a child's brain has achieved 95% of its wiring foundation. The first findings from the advancement of technology in the neuroscience field were published by the Families and Work Institute in *Rethinking the Brain: New Insights into Early Development*, 1996. This publication examined five major findings and their relevance to the development of young children and those who work with young children.

- 1. *The brain of a three-year-old is two and a half times more active than an adult's brain.*** Babies are born with only a minimal amount of neurological wiring. The neurons are ready to be connected, but those connections are dependent on the child's senses to bring information from the child's experiences into the brain. During the first three years of life, a child builds an estimated 1,000 trillion synapses through the experiences encountered.
- 2. *Brain development is contingent on a complex interplay between genes and the environment.*** One of the most dramatic findings from medical research is the significant role the environment plays in the structure and capacity of the brain. Scientists agree that human development is shared by both nature (biology) and nurture (experience) (National Research Council, 2000). Many researchers (Goleman, 2006; Ramey and Ramey, 1999; Sousa, 2011) believe that the environment plays a substantial role in development.
- 3. *Experiences wire the brain. Repetition strengthens the wiring.*** The primary task of the brain during early childhood is to connect brain cells (neurons). Everything we learn is stored in communities of neurons. Experience forges the connections and repetition strengthens them.
- 4. *Brain development is non-linear.*** There are fertile times when the brain is able to wire specific skills at an optimum level. These fertile times are called "windows of opportunity" (see the table on page 5). The windows are scientific; they are open from birth to puberty. Positive experiences during open fertile windows result in positive outcomes. Negative experiences during open windows result in negative outcomes.
- 5. *Early relationships affect wiring.*** A young child depends on adults. Children are biologically wired to speak, think, feel, interact, and to be mobile. However, they depend on human interaction to learn these skills. According to Daniel Goleman (2006), how prolific they are depends on environmental factors, such as a loving atmosphere (for better) and stress (for worse).

2) Supporting Learning Domains

The Frog Street continuum focuses on this research in each of the interactions to optimize learning in all developmental domains.

- **Language Development** – There is no more fertile time in life for developing language than during the first years. Infants and toddlers need a language-rich environment filled with sounds and people who talk to them, read to them and sing to them. The ability to learn language is largely an auditory experience but hearing sounds alone will not be enough. Children are very receptive to vocabulary development during the first few years of life. At 18 months, a child who has been around a talkative caregiver will have 185 more vocabulary words than a peer in a less talkative environment. By the time the child in the language-rich environment is two years old, the increase in vocabulary will be 295 words.

Since the size of a child's vocabulary is an important predictor of later reading success, *Frog Street Infant* and *Frog Street Toddler* offer many interactions for the child to comprehend and use increasingly complex and varied vocabulary. Board books, finger plays, songs, and poems offer many opportunities to develop a rich vocabulary. And caregivers are given tips and strategies for incorporating spoken language into daily routines and tasks. Building an awareness of sounds and developing vocabulary are the primary goals of language and communication activities in the curriculums.

- **Cognitive Development** – The first cognitive function that is wired in the brain is the relationship between cause and effect. For the first year of life, a child will diligently strive to understand what causes things to happen. By the middle of the second year of life, the cognitive focus will change from cause and effect to problem solving. A child will be driven by curiosity and aided by creativity. *Frog Street Infant* and *Frog Street Toddler* enhance cognitive development with developmental stages of activities for the home visitor and family interactions.

Opportunities to explore cause-and-effect relationships, develop curiosity, practice problem-solving skills and express themselves creatively are provided in a developmental progression of activities in Frog Street curriculums. In addition, a child begins to understand the relationships between numbers and quantities, notice basic movement patterns as well as patterns in the environment, and build the foundation for scientific inquiry by exploring their world with all their senses.

- **Physical Development** – After birth, brain wiring for muscle control is a high priority. The foundation for motor development is wired in the first two years of life. A child needs experiences that support the wiring of both small muscles and large muscles of their body. There is a direct correlation between freedom to move during the first two years of life and the agility and dexterity that a child will possess as an adult. Between the ages of two and five, a child needs plenty of space to move as this is the greatest opportunity for the child to perfect his or her motor skills.
- **Approaches to Learning** – How a child approaches learning is one of the key dimensions of school readiness according to the National Education Goals Panel (1997). Frog Street curriculums suggest approaches toward learning with activities for encouraging adults to help a child adjust their innate inclinations (Rothbart and Bates, 2006; Brophy, 2004) for curiosity, creativity, initiative, persistence, and attention. From simple tasks, such as getting things in and out of boxes to exploring cause-and-effect relationships, problem-solving opportunities are abundant.

- **Social and Emotional Development** – In order to develop a positive sense of self, a child comes to understand that they can cause good things to happen on a predictable basis. Babies form a strong emotional and social bond with family members during the first few months of life. The interactions affect the structure and capacity of their brain wiring and will have a lifelong impact on their future development. True sense of self develops between 15 and 18 months. A child is now able to connect thoughts to actions and feelings.

Caregivers are the important role models in the infant and toddler's early social and emotional experiences. Their responses are crucial to a child's sense of self and understanding how he or she fits into their world. As early as one month, babies react emotionally to their environment. By four months, babies are able to recognize differences in expressions and begin to laugh. During the first 18 months, a child is aware of other children but not interested in interacting.

During the second year, children will move from onlooker (watching others) to parallel play (playing beside others) to associative play (playing with others but in an organized fashion). These are all big steps toward the final goal of cooperative play where children interact in organized play with their peers. Frog Street curriculums provide adult-child interactions to develop social and emotional skills and encourage age-appropriate peer interactions for group socializations. A child's development of appropriate social and emotional skills will influence success in school, friendships, and eventually success at work (Bailey, 2015). Frog Street's definition of high-quality, research-based curriculum includes characteristics of the adult-child interactions, such as sensitivity and stimulation (e.g., responsiveness to the child's needs and signals, positive affect, and frequent verbal and social interaction).

3) Integrating Strong Social-Emotional Foundation with Conscious Discipline®

Conscious Discipline® strategies are included in the activities throughout the social and emotional domain of the Frog Street curriculums. Dr. Becky Bailey, author of Conscious Discipline®, provides social-emotional strategies to create a foundation of safety and caring. Conscious Discipline® is a research- and evidence-based curriculum focused on brain-compatible strategies for self-regulation. Self-regulation is the key to school readiness and more powerful than IQ as a predictor of academic achievement (Bailey, 2015). A child learns best in an environment where they feel safe and free from stress (Jensen, 2005; Sousa, 2005). Learning environments and interactions in Frog Street curriculums help children feel safe and loved. From this foundation, a child begins learning how to manage emotions and interact appropriately with peers as they progress through developmental stages.

4) Ensuring Intentionality to Meet the Needs of All Learners

To be intentional is to act purposefully with a goal in mind and a plan for accomplishing it (Epstein, 2007). The intentional teacher applies the best practices in a balanced offering of child-guided and adult-guided experiences (Epstein, 2014). The balance between free choice and structure is what makes "guided play" a successful teaching tool for a range of educational outcomes. (Weisberg, Hirsh-Pasek, & Golinkoff, 2013; Weisberg et al., 2013). Activities with specific outcomes or goals for the child are the focus in Frog Street curriculums. Lesson plans can be customized to meet the developmental needs of children with activities in the curriculum.

Frog Street curriculums provide activities to support a developmental scope and sequence based on the latest scientific brain research. The activities and interactions support the “Windows of Opportunity” for wiring in each of the developmental domains. Frog Street’s AIM Birth to Five Observational Assessment and progress monitoring tools also include strategies and activities for differentiation instruction. This supplemental resource provides developmentally appropriate adaptations and suggestions to help teachers guide children’s learning along the continuum of the leveled progressions.

Windows of Opportunity

WINDOW	WIRING OPPORTUNITY	GREATEST ENHANCEMENT
Emotional Intelligence Trust Impulse Control	0 - 48 months 0 - 14 months 16 - 48 months	4 years to puberty
Social Development Attachment Independence Cooperation	0 - 48 months 0 - 12 months 12 - 24 months 24 - 36 months	4 years to puberty
Thinking Skills Cause and Effect Problem-Solving	0 - 48 months 0 - 16 months 16 - 48 months	4 years to puberty
Motor Development	0 - 24 months	2 years to puberty
Vision	0 - 24 months	2 years to puberty
Language Early Sounds Vocabulary	0 - 24 months 4 - 8 months 0 - 24 months	2 - 7 years 8 months to puberty 2 - 5 years
Second Language Vocabulary Formal Instruction	0 - 60 months (sounds) 6 - 10 years (syntax)	

(Schiller, 2016; Ramey & Ramey, 1999; Rethinking the Brain, 1996)

Organized Developmental Scope and Sequence

The scope of Frog Street curriculums includes learning experiences in the areas of Approaches to Learning, Social and Emotional Development, Language and Communication, Cognition, and Perceptual, Motor and Physical Development. The breadth and depth of activities ages 0 to 36 months meets not only the Head Start Early Learning Outcomes Framework domains, but also sufficiently engages and sustains a child’s interest across multiple learning experiences to address specific developmental goals within each sub-domain.

Concrete experiences with progressively complex interactions are essential for meaningful learning (Caine and Caine, 1991). Age and developmentally appropriate activities support the child's optimal learning level or “zone of proximal development” (Vygotsky, 1978). The zone of proximal development is based on the understanding that learning will not occur at its optimal level if the child is not challenged enough (Tomlinson et al., 2003) or if they are over-challenged and frustrated (Kapusnick and Hauslein, 2001).

In addition to the research base already cited, *Frog Street Threes* and *Frog Street Pre-K* continue the developmental progression to address additional research in the areas of literacy, mathematics and science experiences.

Early Literacy

Early Literacy plays a key role in enabling the kind of early learning experiences that research shows are linked with academic achievement, reduced grade retention, higher graduation rates and enhanced productivity in adult life (Strickland, Riley-Ayers, 2006). *Frog Street Threes* and *Frog Street Pre-K* recognize the importance of language as both a social and academic function. The experiences in *Frog Street Threes* and *Frog Street Pre-K* emphasize the key predictors of early literacy to form the foundation for learning to read: oral language, alphabetic code (letter knowledge, phonological awareness), print knowledge and concepts, comprehension, and written expression (The Report of the National Early Literacy Panel, 2011; Shanahan & Longian, 2013).

- **Phonological Awareness** is a key indicator of how successful students will be with later literacy development. Phonological awareness is considered to represent an umbrella term that includes children's sensitivity to, and capacity to manipulate, sounds within spoken language at varying levels of linguistic complexity, from the whole word to the phoneme (National Early Literacy Panel, 2008). Children engaged in the Frog Street curriculum become aware of how words work in sentences and how sounds work in words. Children identify and manipulate parts of spoken language, including words, syllables, beginning sounds, rhyme, onset and rime, as well as individual phonemes. Note: *Frog Street Threes* scope and sequence for Phonological Awareness includes awareness of (not mastery) skills as children develop sentence segmentation, syllable segmentation, rhyme awareness, alliteration, and onomatopoeia. Strategic lessons are provided in Morning Message that support intentional instruction in this carefully sequenced progression of skills.
- **Alphabet Knowledge** is defined specifically as the recognition and the production of the names and sounds of letters. Knowledge of the alphabet upon kindergarten entry is a strong predictor of later reading success (Adams, 1990; National Research Council, 1998; Whitehurst, Lonigan 2001). Pashler (2006) details how to optimize memory or learning sets of information and overcoming obstacles to forgetting. He suggests the optimal review cycle to remember a set of items, such as alphabet letter names and alphabet letter sounds should follow a distributed practice and be reviewed every 18 to 36 days. *Frog Street Pre-K* provides a detailed scope and sequence of intentional instruction for letter naming and letter sounds based on learning letter names and subsequent sounds through six different “advantages” (Justice, Pence, Bowles & Wiggins, 2006; Reutzel, 2014):
 - Own-Name Advantage (where letters occur in children's names)
 - Alphabetic order (where letters are taught in alpha order)
 - Letter pronunciation effect (where the sound of the letter is also in the name)
 - Letter frequency effect (letters that occur most frequently in written language)
 - Consonant Phoneme Acquisition order effect (order of sounds the child first learns to articulate in oral language)
 - Letter Writing Advantage (where explicit letter formation is taught and practiced)

Note: *Frog Street Threes* provides activities for letter recognition during Morning Message, Read Aloud, and centers.

Instructional activities that support the research include Morning Message, Literacy Small Group, and Literacy Practice Centers as well as strategies for Letter Walls, Multi-sensory Letter Writing, English Language Learner Strategies, and Spanish Literacy development.

Together, considerable evidence suggests that Phonological Awareness and Alphabet Knowledge intertwine to allow children to comprehend the basic idea of the alphabetic principle, learn the regularities of the associations between sounds and letters, and apply these words in print (Ehri, 2002; Phillips & Torgensen, 2006; Shanahan & Lonigan, 2013).

- **Oral Language and Vocabulary** is a critical area of Frog Street curriculums based on research that indicates the size of a child's vocabulary in kindergarten is a key predictor of reading success (Scarborough, 2001). Furthermore, research shows that gaps in vocabulary are most successfully addressed during the preschool years (Biemiller, 2006; Cunningham, 1997). When children develop vocabulary, they use words to communicate effectively for speaking and understanding. The growth of vocabulary occurs through conversations with peers and adults as well as through intentional instruction associated with themes, books and lessons.

Frog Street curriculums utilize strategies to contextualize targeted vocabulary, which allows children to develop both receptive and expressive vocabulary. Words are first introduced within the context of a story or activity, and then are used in decontextualized situations within the classroom so that children learn to apply newly acquired vocabulary to new situations. Visual cues are critical to the instruction of vocabulary in the preschool classroom. Frog Street utilizes richly illustrated books, full-color photograph books, Photo Activity Cards, Pocket Photos, Picture Vocabulary Cards and Story Folder Props to provide a resource for vocabulary instruction that includes both direct instruction on targeted words and direct instruction of strategies for vocabulary acquisition (Harris, Hirsh-Pasek, Golinkoff, 2011).

- **Comprehension skills and strategies** form the basis of all future reading success. Children in preschool develop their comprehension skills through experiences that promote oral and written language skills, such as discussions, play activities, retellings, and emergent readings (Dickinson and Tabors, 2001). Frog Street curriculums provide children with many rich opportunities to develop and practice comprehension with critical thinking strategies. Daily Read Aloud Time provides teachers with intentional instruction in activating prior knowledge, questioning strategies for higher order thinking, dramatic expression for creative thinking and other critical comprehension strategies. Children have many opportunities to retell stories through role-play, magnetic story props, and sequence cards. These materials support the scaffolding of the child's attempts to retell a story through the use of concrete props. In addition, Frog Street curriculums use graphic organizers (T-charts, Venn diagrams, Word webs) to provide for deeper processing of key vocabulary and its relationship to comprehension (Coyne, Simmons & Kame'enui, 2004).
- **Written Expression** for the preschool child develops in conjunction with early reading skills (Roskos, Christie, & Richgels, 2003). "Incorporating writing into your daily schedule is essential to supporting children's emergent literacy development" (Benson, 2004). Instruction in Frog Street curriculums allows children to develop an understanding of the purpose of writing and its relationship to reading. Morning Message provides a daily opportunity for modeled writing, and throughout each day there are opportunities for shared writing and for children to practice their own writing skills as they draw and illustrate, write notes, maintain journals, create books, label pictures and much more. The development of writing skills is supported through scaffolding of instruction during small-group instruction and center time. Thematic written expression activities incorporate real life experiences.



Mathematics

Mathematical investigations in Frog Street curriculums are purposeful, engaging and build upon children's informal understandings of patterns, numbers, measurements and shapes. The knowledge and skills that children will learn can be summarized in relationship to the critical content domains recommended by the National Council of Teachers of Mathematics.

- **Number and Operations** for preschool children includes the understanding of quantity and numerical relationships (Fuson, Grandau, Sugiyama, 2001). Frog Street curriculums provide opportunities for children to correspond the verbal counting sequence with one-to-one correspondence with sets of concrete, pictorial, and auditory collections. In addition, children develop strategies for naming, combining, separating, and comparing quantities and quantifying data. These skills are necessary for success in later mathematics instruction (Griffin, 2003).
- **Geometry and Spatial Awareness** includes understanding shape, location and spatial transformations. Using Frog Street curriculums children learn to recognize attributes of two- and three-dimensional shapes and to understand how shapes are alike and different. Preschool children enjoy manipulating shapes and their intuitive knowledge of shape often exceeds their knowledge of numbers (NAEYC & NCTM, 2010).

Through daily intentional mathematics instruction, Frog Street curriculums relate this intuitive knowledge to academic vocabulary and concepts that will form a firm foundation for children as they enter kindergarten.

- **Measurement** in the preschool classroom means that children can quantify and compare space, length, weight, area and volume using terms such as longer, shorter, heavier, wider and fuller. Children at this age will begin to compare and measure using non-standard as well as standard basic units. The use of non- standard units helps children to connect quantity (number) to measurement (Clements and Sarama, 2009). As this relationship solidifies, it is also beneficial for children to start using uniform standard units to continue exploration of measurement (Clements, 2003).
- **Classification and Patterning** concepts involve sorting, grouping and repeating a pattern within a core of objects. Frog Street curriculums will guide children to identify, extend and create repeating patterns. These activities have been shown to increase number awareness, counting strategies and problem solving as well as helping children develop the foundations for algebraic thought (Copley, 2000).
- **Data Collection and Analysis** in the preschool classroom involve children building the foundations of data collection and analysis as they describe, sort, and compare physical and mathematical characteristics such as size, quantity or shape. The skills developed here lead to greater competencies in the later grades (Copley, 2000).

Frog Street Pre-K Curriculum: Fall to Spring Gains in School Readiness

Study Overview

The National Opinion Research Center (NORC) at the University of Chicago conducted an independent study to examine fall to spring differences in school readiness rates for children who attended public preschool in Texas districts that used the *Frog Street Pre-K* curriculum.

Study Approach

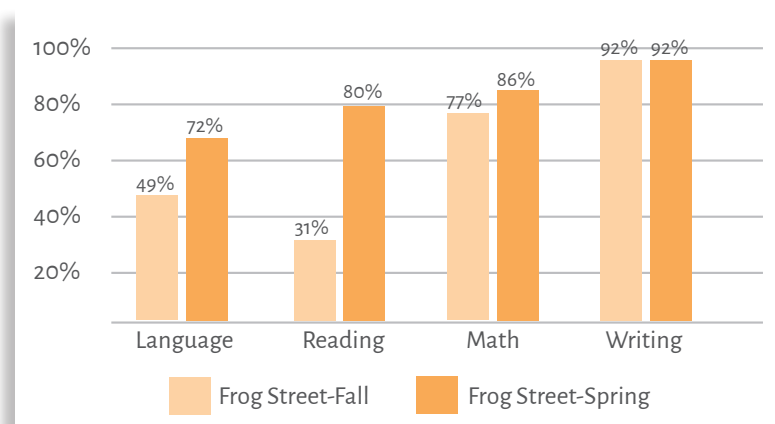
NORC used a pretest-posttest design to examine the fall to spring school readiness rates for students who attended a public preschool program in Texas districts that used the *Frog Street Pre-K* curriculum. The study compared the percentage of students who met the established benchmark scores on the CIRCLE assessment in four domains at two time points: preschool entry (fall) and preschool exit (spring).

Depending on the domain, the analytic sample included 75,699 to 134,613 preschool-aged students in 634 to 734 Texas districts across three school years (2016-17, 2017-18, and 2018-19). Overall, 87% of students in the sample are from low-income families; 56%-62% are Hispanic; 14%-17% are Black; and 23%-31% are Dual Language Learners.

Results

Students who attended public preschool in Texas districts that used the *Frog Street Pre-K* curriculum demonstrated statistically significant gains from fall to spring in attaining the CIRCLE assessment benchmark scores for three domains: Language, Emergent Literacy Reading, and Math. The percent of students who attained the CIRCLE assessment benchmark score for Writing was consistently high at 92% from fall to spring. See Figure 1.

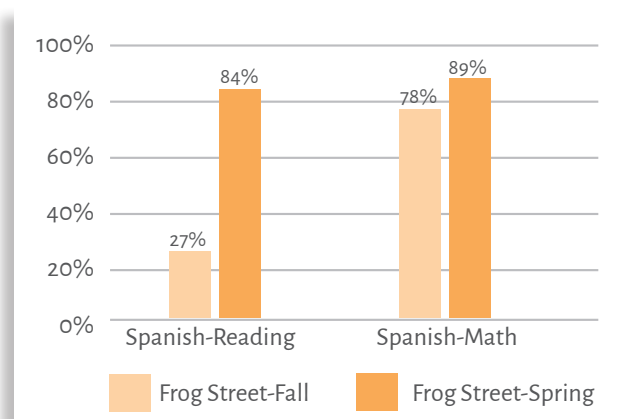
Figure 1. Percent of Students Who Attained Benchmark Scores on the CIRCLE Assessment, Fall to Spring Comparisons



N=116,445 for Language; 117,892 for Reading; 134,613 for Math; and 75,699 for Writing **** p<.01, **p<0.05, *p<.10

Students who attended public preschool in Texas districts that used the *Frog Street Pre-K* curriculum demonstrated statistically significant gains in attaining the benchmark score from fall to spring on the Spanish version of the CIRCLE assessment in two domains: Emergent Literacy Reading and Math. See Figure 2.

Figure 2. Percent of Students Who Attained Benchmark Scores on the Spanish Version of the CIRCLE Assessment, Fall to Spring Comparisons



N=35,549 for Spanish-Reading and 27,788 for Spanish-Math *** p<.01, **p<0.05, *p<.10

Pre-K Curriculum Impacts Student Performance on Local and State Assessments in Later Grades

Study Overview

This study is the result of research that compared the impact of a strong early childhood Pre-K curriculum on children's performance on local and state assessments administered later grades. The overall findings indicate that children who were enrolled in a Pre-K program in Grand Prairie ISD, and were being exposed to and utilizing the Frog Street program and curriculum, showed gains in reading scores on the local District Reading Assessment (DRA) and later on the third grade State of Texas Assessment of Academic Readiness (STAAR). Gains were made in reading comprehension, but also in math due to the amount of reading that is included on state math assessments. The research ultimately finds that Frog Street curriculum has lasting effects on future student academic performance.

Key Findings

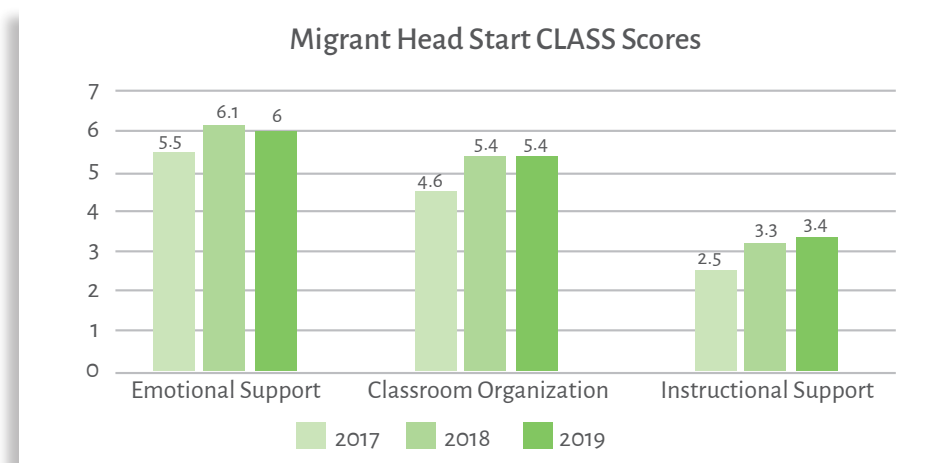
- Reading comprehension among *Frog Street Pre-K* program participants was a statistically significant predictor of student performance on STAAR reading assessment. Further, each unit increase in reading comprehension in Pre-K was associated with a 17-point increase in the STAAR reading scale score in grade 3.
- Reading comprehension among *Frog Street Pre-K* program participants was a statistically significant predictor of student performance on STAAR math assessment. Further, each unit increase in reading comprehension in Pre-K was associated with a 12-point increase in the STAAR math scale score in grade 3.
- Study participants who scored 16 points or higher on the DRA reading comprehension exam in Pre-K were 12.38 times more likely to meet expectations on the STAAR math assessment in grade 3.

Increasing CLASS scores for Infant, Toddlers and Preschoolers

Many programs that have implemented Frog Street curriculum have experienced increased scores in key CLASS® domains compared to the years previous to Frog Street implementation. Many administrators feel that Frog Street curriculums are built with tools, guidance, and instructional strategies that complement a program's focus on improving teacher-child interactions. These interactions form the foundation for classroom quality while setting all children up for future school success.

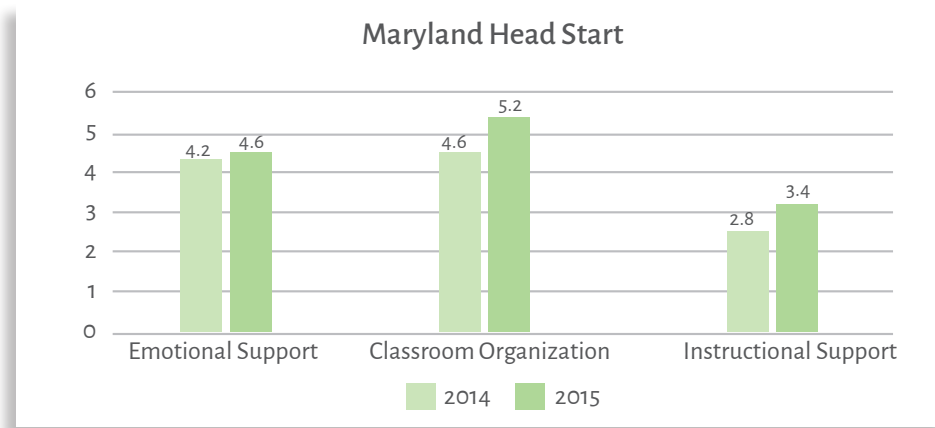
Migrant Head Start Program - California

Implementation of Frog Street Curriculum began in this Migrant Head Start program in the fall of 2018. The program's primary goal was to improve performance in the Instructional Learning Formats dimension within the Classroom Organization domain on CLASS evaluations. Past evaluations had shown a decline in these areas. In just one year, CLASS evaluations showed an increase in scores in all CLASS domains after implementing Frog Street curriculum. The performance was also maintained in 2019 evaluations. Administration believes that Frog Street supports all teachers, regardless of experience, with the tools necessary to provide quality instruction and experiences for the children in their classrooms.



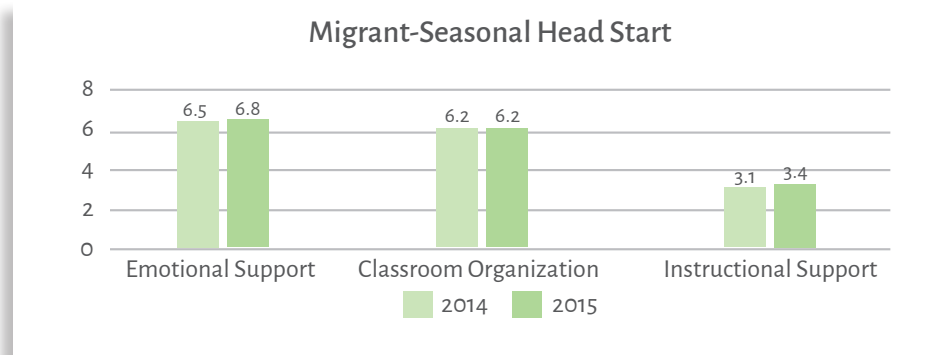
Community Head Start Program - Maryland

This community Early Head Start and Head Start program began implementation of Frog Street curriculum with infant, toddler and Pre-K classrooms in 2014. In one year, the program saw an increase of CLASS scores in all domains. Program administrators believe that implementation of Frog Street curriculum improved their scores, particularly in the areas of Concept Development, Quality of Feedback, and Language Modeling. Administrators stated that Frog Street helped to provide open-ended questioning, advanced language, and many other items that supported teachers' improvement in these areas.



Migrant/Seasonal Head Start

This Migrant/Seasonal Head Start chose to implement Frog Street Pre-K curriculum in the fall of 2015 in efforts to align curriculum with school readiness goals. Administration chose Frog Street because of its integrated instruction across developmental domains. They felt that Frog Street was well-organized and would support teaching staff in planning appropriate activities and experiences while supporting quality interactions with the children in their classrooms. In one year's time, the program saw an improvement in quality interactions by an increase in CLASS scores in all domains.



Frog Street Press is focused on high quality instruction and materials in the field of early childhood education. Frog Street Pre-K was developed by early childhood experts in every domain of development to create an intentional and integrated curriculum.