

**Frog  
Street  
Pre-K**

# **Theoretical Research Base And Empirical Data**

**frögstreet**





# ***Frog Street Pre-K***

## **Theoretical Research Base**

## **Empirical Data**

### **Theoretical Research Base**

*Frog Street Pre-K* is a comprehensive curriculum based on the most current research in early childhood education including brain development research. The program is rooted in a deep knowledge of child development and empowers teachers to know not only what to teach but also the how and why of instructional strategies. The foundation of the program includes five cornerstones:

- **Integration of Themes, Disciplines and Learning Domains**
- **Social and Emotional Development**
- **Differentiated Instruction**
- **Equity of English and Spanish Instruction and Materials**
- **Child-Centered Approaches toward Learning**

### **Integration of Themes, Disciplines and Domains**

#### **1. Themes:**

*Frog Street Pre-K* was specifically designed to meet current early childhood standards within the learning disciplines. A series of nine themes provides instruction for ten domains: Social and Emotional Development, Language and Literacy, Mathematics, Science, Social Studies, Fine Arts, Physical Development, Social Studies, and Technology. Because the brain learns through patterns and connections, a thematic approach is best suited for our younger learners (Sousa 2008). Research has consistently shown that children in integrated programs demonstrate academic performance equal to, or better than, children in discipline-based programs. In addition, children are more engaged in school, and less prone to attendance and behavior problems (Drake & Reid, 2010.) Children learn by active engagement with their environment and through social engagement with other human beings. Multiple complex and concrete experiences are essential for meaningful learning and teaching (Caine & Caine, 1991). The nine themes in *Frog Street Pre-K* and the instruction contained therein provide these experiences.

#### **2. 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 Pre-K* recognizes the importance of language as both a social and academic function. The social aspect will be addressed in the section on Social and Emotional Development. The academic areas of early childhood literacy in *Frog Street Pre-K* include: **phonological awareness; alphabet knowledge; oral language and vocabulary; comprehension and written expression.**

- a. **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 Pre-K* curriculum become aware of how words work in sentences and how sounds work in words. They identify and manipulate parts of spoken language; including words, syllables, beginning sounds, rhyme, onset and rime, as well as individual phonemes. Strategic lessons are provided in Morning Message that support intentional instruction in this carefully sequenced progression of skills.

- b. **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):
- 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)

*Frog Street Pre-K* Letter Knowledge instruction guides children to identify the letters in their own name and the names of their friends in Theme 1. Themes 2 and 3 introduce letters children first learned to speak. Letters are presented in groups of three or four each week because this increases the effectiveness of letter learning (McGee, 2007) and include two letters that will be visually similar, thus easily confused by younger learners. Children store their recognition of letters in higher regions of the brain when they are presented with a set of three letters that they can compare and contrast. Theme 4 addresses letters that have their typical sound embedded in the name of the letter. Theme 5 uses the alphabetic approach with a focus on upper and lower case letters. Themes 6 and 7 use the letter frequency approach focusing on those letters used most often in print, and Themes 8 and 9 focus on letter writing which couples the motor memory of writing a letter with remembering the name and sound. This combined approach optimizes learning and memory of alphabetic concepts.

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; Share, 1995).

- c. **Oral Language and Vocabulary** is a critical area of *Frog Street Pre-K* 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 Pre-K* utilizes strategies to contextualize targeted vocabulary which allow students 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 students learn to apply newly acquired vocabulary to new situations. Visual cues are critical to the instruction of vocabulary in the pre-k 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 (National Early Literacy Panel, 2008).

- d. **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 Pre-K* provides students with many rich opportunities to develop and practice comprehension. Daily Read Aloud Time provides teachers with intentional instruction in activating prior knowledge, questioning, dramatic expression 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 Pre-K* uses 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).
- e. **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 Pre-K* 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 practice center time. Thematic written expression activities incorporate real life experiences (Reagan's Journal, Theme 8 – Insect Journals.)

### 3. **Mathematics:**

*Frog Street Pre-K* provides purposeful, engaging mathematical investigations and activities that build upon children's informal understandings of patterns, number, measurement and shape. 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.

- a. **Number and Operations** for preschool children includes the understanding of quantity and numerical relationships (Fuson, Grandau, Sugiyama; 2001). *Frog Street Pre-K* provides 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).

- b. **Geometry and Spatial Awareness** includes understanding shape, location and spatial transformations. In *Frog Street Pre-K* 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 number (NCTM, 2000). Through daily intentional mathematics instruction, *Frog Street Pre-K* relates this intuitive knowledge to academic vocabulary and concepts that will form a firm foundation for the student as they enter kindergarten.
- c. **Measurement** in the pre-K 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 students to start using uniform standard units to continue exploration of measurement (Clements, 2003).
- d. **Classification and Patterning** concepts involve sorting, grouping and repeating a pattern within a core of objects. *Frog Street Pre-K* 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).
- e. **Data Collection and Analysis** in the pre-K 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).

#### 4. **Developmental Learning Domains:**

*Frog Street Pre-K* provides a carefully crafted program of intentional instruction in five domains: physical development, social and emotional development, cognitive development, language development and approaches to teaching. Children are exposed to varied activities from each domain each day, providing the best learning environment (Schiller, 2001). Physical activities are built into the instructional day and social and emotional needs are addressed through classroom routines, child centered activities as well as explicit instruction. *Frog Street Pre-K* utilizes a variety of teaching approaches including small groups, individual activities, cooperative strategies and whole group routines. In addition, a variety of modalities are addressed through music, movement, problem solving, and interactive activities. This ensures all children get a chance to experience the curriculum in a variety of ways which in turn leads to greater mastery of concepts (Scott, et al, 2010).

#### **Social and Emotional Development**

At the heart of *Frog Street Pre-K* is Conscious Discipline™ (Becky Bailey, 2001), a program that develops social and emotional intelligence. Children learn best in an environment where they feel safe and free from stress (Jensen, 2005, Sousa, 2005). This is particularly true for the preschool classroom because the optimum window for children to wire for social and emotional intelligence is between birth and four (Ramey and Ramey, 1999.) Daily routines such as Greeting Circle, Kindness Tree and the Celebration Center are just a few of the ways that children learn to share

emotions appropriately with peers and teachers. Children can see appropriate behavior strategies modeled throughout each instructional day and are encouraged to share Conscious Discipline strategies, songs and rituals with their family at home. The Family Connections CD provides many take home resources for this purpose.

### **Differentiation of Instruction**

In order to meet the diverse needs of the learners in the Pre-K classroom, Frog Street provides options for English Language Learners, Special Needs students as well as advanced learners. Differentiation of instruction recognizes and responds to student differences in readiness, interests and learner profiles. Frog Street provides for small group instruction which allows teachers to teach within each child's optimal learning level, or "zone of proximal development" (ZPD) (Vygotsky, 1978). ZPD is based on the understanding that learning will not occur at its optimal level if children are not challenged enough (Tomlinson et al., 2003) or if they are over-challenged and frustrated (Kapusnick & Hauslein, 2001). Recommendations for adapting the instruction to meet the needs of the small group are available in the Frog Street Teacher Guides at point of use. Teachers are given simple tools to monitor student progress so that instruction can be flexible as the learner's needs change. Materials such as the Developmental Storybook and Strategy Cards provide appropriately leveled instruction for students in the Frog Street classroom. Learning Center adaptations are at point of use in each teacher guide to meet individual needs. Adaptations for Young Learners Teacher Guide targets forerunner skills in Literacy and Mathematics for children needing such skills.

### **Equity of Materials and Instruction in English and Spanish**

A bilingual or dual language classroom must have access to equitable materials in both languages in order to be successful. "Bilingual education" is the use of two languages as media of instruction for a child or a group of children in part or all of the school curriculum (Cohen, 1975). It is also acknowledged that it is impossible to totally separate language and culture. Therefore, the term bilingual education includes the concept of bicultural education (Ovando & Collier, 1985). *Frog Street Pre-K* provides all teacher dialogue and instructional materials in both English and Spanish. Literature and oral stories feature adaptations from English into Spanish rather than a direct translation in order to preserve the instructional content. Many stories originated in Spanish and were sensitively adapted into English. In addition, the curriculum features authentic stories from Hispanic culture by authors, Isabel Campoy and Alma Flor Ada. The Cultural Rhymes Flip Book is a resource to celebrate the various rhymes and chants from nine cultures. Research has shown that there is a clear link between appropriate bilingual materials and curriculum and children academic achievement (Oakes & Saunders, 2002). Children in the bilingual *Frog Street Pre-K* classroom will be well positioned for future success in school.

### **Child Centered Approaches Toward Learning**

According to Webster, joyful means "experiencing well-being, success, or good fortune." *Frog Street Pre-K* teacher training and resources encourage child-centered approaches that foster learning opportunities based on brain development research and best practices in early childhood. Daily activities allow children to explore, create and play within the framework of the curriculum. These practices have been shown to increase achievement as well as to increase social and emotional competence AND a sense of well-being.

Definitions of high-quality preschool settings often include characteristics of the adult-child interactions, such as sensitivity and stimulation, e.g., responsiveness to the children's needs and signals, positive affect, and frequent verbal and social interaction. Factors important for school readiness also include the amount of time being read to, one-to-one teaching interactions,

engagement with functional and environmental print, use of well-planned lessons, and incorporating materials in play that promote literacy, math, and science in play settings. In addition, other significant factors described as key for an effective learning environment include the physical setup and richness of a child's classroom.

Learning is inhibited when children do not feel emotionally safe (Jensen, 2005, Sousa, 2005, Goleman, 1998.) *Frog Street Pre-K* offers specific social interactions and daily routines to encourage a foundation of safety and caring.

Children learn better in smaller spaces (Epstein, 2007); this practice is supported in *Frog Street Pre-K* with small group instruction and learning centers. When children are offered choices, especially about learning activities, they feel more positive about their work and, at the same time, they feel less anxiety. Choices allow learners to reach self-determined goals, sparking and maintaining children motivation, which is critical to learning (Schiller, 1999.) Adult-child verbal and social interactions are encouraged through reciprocal exchanges in dialogue and are referenced in *Frog Street Pre-K* lessons through Read Aloud, Literacy and Math Small group and Learning Center Reflect questions.

A brain smart learning environment is encouraged in *Frog Street Pre-K* with suggestions for transitions, scheduling and room layout. Too much stimuli is overwhelming to everyone but especially to young children who are not as skilled at determining which stimuli to accept and which to reject. Less is more visually but less is also more when it comes to amount of information. Working memory must process the information that is allowed into the brain. It has a limited capacity. For children younger than five it is an average of two items and for children between five and fourteen it is an average of five (Cowan, 2001). This means that when providing new information to children we must again be careful not to over stimulate (Perry, 2001.)

*Frog Street Pre-K* curriculum encompasses a wide body of research-based practices and brain based research to encourage the social and emotional, physical, language and cognitive development of a child.



## Empirical Research on Effectiveness:

To date, Frog Street has obtained and examined assessment data from four school districts/agencies, to demonstrate the effectiveness of the curriculum. The demographics of all these classrooms are similar due to how children qualify for prek classes: English as a Second Language, below poverty level income, homeless, or military family. Noteworthy findings include the following:

### **United Way of Metropolitan Nashville (2010-2013) Summary of Findings: (See separate attachment for a more detailed report of the findings from this study):**

1,200 pre-school children, age 4, were assessed individually with norm-referenced tests by an appropriate instructor or agency mentor. Significant increases were found in children's literacy skills in classrooms implementing *Frog Street Pre-K* curriculum each school year (e.g., 2010–11, 2011–12, 2012–13).

- The Getting Ready to Read test scores showed an increase of 30% from Fall 2010 to Spring 2011; an increase of 41% from Fall 2011 to Spring 2012; and an increase of 15% from Fall 2012 to Spring 2013.
- The Get It, Got It, Go! Assessment indicated significant increase in performance indicators for rhyming, picture naming, and alliteration.
- The Phonological Awareness Literacy Screening subtests increased significantly and met or exceeded targeted goals.

### **San Antonio Independent School District:**

District officials assessed 2323 children using the Frog Street Assessment (FSA), an online assessment of 30 subtests measuring knowledge in ten learning domains.

- Students showed significant gains from BOY to EOY, specifically on subtests identified as highly predictive of later literacy achievement.
- Letter knowledge and phonological awareness subtests based on the Texas Prekindergarten Guidelines showed significant increases from BOY to MOY.
- There was an increase in scores for both English and Spanish speakers on Number and Operations, Geometry and Spatial Awareness, Measurement, Classification and Patterning, and Data Collection and Analysis.

### **Houston Independent School District (2011–12):**

The Houston Independent School District (HISD) assessed the effectiveness of the *Frog Street Pre-K* program on its prekindergarten students labeled as economically disadvantaged.

- Results showed that a greater percentage of these students scored at the “developed” level in both the “Rhyming” and “Letter Naming” subtests on the Texas Primary Reading Inventory (TPRI) in kindergarten compared to the economically disadvantaged student group who did not attend HISD prekindergarten. See <https://www.tpri.org/index.html> for information on the Texas Primary Reading Inventory
- Both economically disadvantaged and non-economically disadvantaged HISD prekindergarten groups had a greater percentage of students scoring at the

“developed” level compared to their counterparts who did not attend HISD prekindergarten on TPRI “Letter Naming” and “Rhyming”.

- Five demographic characteristics (economic status, gender, special education status, age, Limited English Proficiency classification) emerged as significant predictors of students’ scoring at the “developed” level (not at risk for developing reading difficulties). When accounting for all five demographic characteristics mentioned, students who attended HISD prekindergarten were 29% more likely to score at the “developed” level compared to their counterparts who did not attend HISD prekindergarten.

**Beaumont Independent School District:**

The Beaumont ISD and Head Start LEA assessed 484 three and four-year-old children using the Frog Street Online Assessment and found that children had significant increases from BOY to EOY in all curriculum areas assessed.

**Read to Succeed  
Assessments 2011-2012**

During the Fall of 2011, Noser Consulting LLC conducted assessments of 264 Pre-K students enrolled in 13 different Read to Succeed sites across Nashville. Midway during the assessment schedule, one of the sites chose to stop administering the Read to Succeed curriculum. At that time, seven of the students had been assessed; the scores of those students are not included in the summary table below. During March and April 2012, Noser Consulting conducted follow-up assessments with the same students from the 12 sites administering the Read to Succeed curriculum, funded through United Way. Eighty-two percent (211 of the original 257) of the students assessed in the Fall were still enrolled in the program and were assessed in the Spring. The number of students assessed by site is presented in Table 1.

Table 1. Number of Student Assessments Per Read to Succeed Site, Fall 2011

Read to Succeed Site	Number of Pre-K Student Assessments (Fall 2011)	Number of Pre-K Student Assessments (Spring 2012)
Bethlehem Centers of Nashville	19	17
Kings Daughter	25	18
18th Avenue Center	12	5
Martha O'Bryan	40	28
McNeilly Center	34	29
Fannie Battle	18	18
Nashville Child Center	11	9
First Steps	7	7
Saint Luke's	17	17
Grace Eaton	5	4
St. Mary Villa	51	41
Wayne Reed	18	18
Total	257	211

In Table 2, we present the overall percentages of students scoring at or above the criterion-level for each sub-component of the three tests: Get Ready to Read, Get It Got It Go!, and the Phonological Awareness Literacy Screening (PALS). These three assessment tools were identified by the Read to Succeed Coordinator in Fall 2011. The criterion scores (column two below) applied to the data were also given to the evaluation team by the Read to Succeed Coordinator at the beginning of Fall 2011.

The overall scores for the 2011-2012 school year are listed in the last three columns in the table below; they represent the percentage of students with scores at or above the criterion score per assessment tool. The scores colored green are ones that met or surpassed the Spring 2012 target. The scores colored red did not achieve the Spring 2012 target. The Fall 2010 and Spring 2011 scores are presented for informational purposes.

Table 2. Overall Percentage of Pre-K Read to Succeed Students Achieving Criterion Scores on Fall Assessment

Performance Indicator	Criterion Score At or Above	Fall 2010	Spring 2011	Fall 2011	Sp 2012 Target	Spring 2012
Get Ready to Read						
Reading Readiness	12	68	99	53	80	94
Get It Got It Go!						
Rhyming	4	45	95	68	90	98
Picture Naming	18	74	96	86	90	100
Alliteration	3	42	99	75	90	100
PALS						
Upper Case Recognition	18	53	88	37	85	80
Lower Case Recognition	12	52	91	39	85	81
Letter Sounds	8	37	84	33	85	79
Beginning Sound Awareness	5	51	95	55	90	100
Print & Word Awareness	7	50	94	42	80	92
Rhyme Awareness	5	56	94	50	85	91
Nursery Rhyme Awareness	6	55	97	43	90	96

\* Data for academic year 2010-2011 were not collected or computed by Noser Consulting LLC

To facilitate decision-making based on the results of these tests, we provide the same results of the percentages of students achieving scores at or above the criterion levels, disaggregated by sites in Table 3. The predetermined “target” score for each assessment is in the second row. The percentage of students achieving the criterion scores at both Fall and Spring assessment periods are included per assessment. The percentages colored in red indicate which assessments did not reach criterion level for that site, e.g., Kings Daughters, 18<sup>th</sup> Avenue Center, McNeilly Center, and Saint Lukes did not reach the criterion scores for the three of the PALS subtests: upper case, lower case, and letter sounds.

Table 3. Site-Level Percentage of Pre-K Read to Succeed Students Achieving Criterion Scores on Fall Assessment

Read to Succeed Site	80		90		90		90		85		85		80		85		90		
	Fall	Sp	Fall	Sp	Fall	Sp	Fall	Sp	Fall	Sp	Fall	Sp	Fall	Sp	Fall	Sp	Fall	Sp	
Target																			
Bethlehem Centers of Nashville	63	100	74	100	89	100	95	100	53	88	53	88	58	94	53	94		100	
Kings Daughters	60	89	60	94	72	100	72	100	28	61	32	61	44	83	52	89	60	100	
18th Avenue Center	17	80	67	100	75	100	92	100	17	40	17	40	8	80	25	80	17	80	
Martha O'Bryan Center	30	100	55	100	70	100	45	100	15	96	15	96	30	96	35	96	13	100	
McNeilly Center	29	90	35	94	85	100	53	97	21	77	26	81	26	87	12	90	24	100	
Fannie Battle	61	100	89	94	100	100	94	100	44	89	44	89	33	89	44	89	22	72	
Nashville Child Center	91	100	91	100	100	100	73	100	64	100	73	100	36	100	36	100	73	100	
First Steps	86	100	86	100	100	100	86	100	43	86	43	86	86	100	100	100	29	100	
Saint Luke's	53	100	94	100	94	100	94	100	41	53	41	53	59	94	71	94	53	100	
Grace Eaton	100	100	100	100	100	100	100	100	100	100	100	100	60	100	100	100	100	100	
St. Mary Villa	73	93	76	100	92	100	88	100	53	88	53	90	53	95	75	95	76	95	
Wayne Reed	44	94	67	100	89	100	72	100	39	61	33	61	39	89	56	67	39	94	
Total	53	95	68	98	86	100	75	100	37	80	39	81	42	92	50	91	43	96	



ONEWAY ANOVA APPROACH

In the data presented on the previous pages, the sites were categorized per assessment tool as to whether a certain percentage of their students scored at or above a criterion level. An alternative way of looking at improvement in assessment scores is to conduct multiple oneway analysis of variance to get an estimate of the likelihood that there was statistically significant improvement on each assessment subscale for each site. Using this approach, the information presented in Table 4 indicates there was **statistically significant improvement across all sites for all of the assessment scales.**

Table 4. Oneway ANOVA Test for Statistically Significant Improvements in Assessment Scores Between Fall 2011 and Spring 2012

		N	Mean	F Statistic	Significance
GRTR Score	Fall 2011	264	12.5568	234.64	<.001
	Spring 2012	213	19.615		
GGG Rhyming	Fall 2011	264	6.1174	133.98	<.001
	Spring 2012	213	11.3474		
GGG Picture Naming	Fall 2011	264	18.9811	445.57	<.001
	Spring 2012	213	30.6573		
GGG Alliteration	Fall 2011	264	4.5795	143.53	<.001
	Spring 2012	213	8.2958		
PALS Upper Case Recognition	Fall 2011	263	12.5133	130.33	<.001
	Spring 2012	213	21.7934		
PALS Lower Case Recognition	Fall 2011	263	8.4373	126.55	<.001
	Spring 2012	213	19.1455		
PALS Letter Sounds	Fall 2011	263	5.4563	173.94	<.001
	Spring 2012	213	15.4319		
PALS Beginning Sound Awareness	Fall 2011	263	5.2015	221.72	<.001
	Spring 2012	213	8.9296		
PALS Print and Word Awareness	Fall 2011	263	5.5627	220.92	<.001
	Spring 2012	213	8.4648		
PALS Rhyme Awareness	Fall 2011	263	5.1331	159.54	<.001
	Spring 2012	213	8.1315		
PALS Nursery Rhyme Awareness	Fall 2011	263	5.038	278.49	<.001
	Spring 2012	213	8.4601		



Using the same oneway ANOVA approach for **each** individual site, the results presented in Table 5 show very different result; the cells are shaded red if there was NOT a statistically significant improvement in the scores between the Fall and Spring assessments. If you were to consider only the results of the ANOVA, as presented below, you would conclude that 18<sup>th</sup> Avenue Center, First Steps, Saint Luke's, Grace Eaton, and Wayne Reed all had tests for which there was not improvement over the year. Since any Pre-K curriculum strives to achieve higher performance scores, this would not be interpreted as a success. However, if you look at Table 3, 86% and 100% of the students at First Steps and Grace Eaton, respectively, achieved the criterion scores for the three PALS tests for which most students seem to struggle the most.

The point in using two different analytic approaches to review the data is to emphasize the need to take a deeper look at the students' growth over the year. The first approach, using the criterion scores to estimate the percentage of students achieving, provides information about how the class as a whole is doing. The second approach, using ANOVA, takes into consideration the level of achievement in the Fall and measures gain or progress, based on that. So, as seen with Grace Eaton in Table 5, there was NOT statistically significant improvement in many tests. This could be interpreted as failure. However, the students scored very high at the Fall, thus there was not much room for improvement on these tests.

Alternatively, if you look at Kings Daughters using the criterion scores, that site did not produce enough students (target of 80%) to achieve the criterion scores on three of the PALS tests in Spring 2012. However, using ANOVA, there was a statistically significant improvement in their scores on these tests – they rose from 24 to 32% achieving criterion scores in Fall 2011 to 56 to 61% achieving them in Spring 2012.

Table 5. Site-level Oneway ANOVA Results

Read to Succeed Site	Get Ready to Read	GGG: Rhyming	GGG: Picture Naming	GGG: Alliteration	PALS: Upper Case	PALS: Lower Case	PALS: Letter Sounds	PALS: Beginning Sounds	PALS: Print & Word	PALS: Rhyme	PALS: Nursery Rhymes
Bethlehem Centers of Nashville	1										
Kings Daughter	2										
18th Avenue Center	3										
Martha O'Bryan	4										
McNeilly Center	6										
Fannie Battle	7										
Nashville Child Center	8										
First Steps	9										
Saint Luke's	10										
Grace Eaton	11										
St. Mary Villa	12										
Wayne Reed	13										
Total											



Join the conversation  
"On the Street"



[www.frogstreet.com](http://www.frogstreet.com)  
[customerservice@frogstreet.com](mailto:customerservice@frogstreet.com)  
800 Industrial Blvd. Suite 100, Grapevine, TX 76051  
P: (800)884-3764 F: (800)759-3828