5-2015

Early Childhood Mathematics for Children who are Deaf or Hard-of-Hearing: Amplifying Opportunities to Develop Foundational Math Skills

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Early Childhood Mathematics for Children who are Deaf or Hard-of-Hearing: Amplifying Opportunities to Develop Foundational Math Skills

by

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A project submitted in partial fulfillment of the requirements for the degree of

MASTER OF EDUCATION

in

Communicative Disorders and Deaf Education

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Utah State University
2015

Introduction

Mathematics is an integral part of early childhood education and development. Mathematic proficiency is not only foundational for success in school, but children also use mathematical knowledge in everyday experiences. The knowledge children gain in math concepts and language used is applicable across all domains of learning (Utah State Office of Education, 2013). Math concepts are developed early in life and preschoolers possess a natural curiosity for math, as well as a natural ability to do math (Linder, Powers-Costello, & Stegelin, 2011). Mathematical skills allow children the ability to make sense of the world, building a foundation for later success in school (NAEYC & NCTM, 2002; NCTM, 2007). Early experiences with math are different than traditional math instruction for children in a K-12 educational setting. The focus is not the worksheets of addition and subtraction commonly associated with math. Rather, it is the notion that math happens informally in every day events as children use mathematical concepts to make sense of their world (Pagliaro & Kritzer, 2013).

Historically, children who are deaf and hard-of-hearing (DHH) have shown slower achievement than their same-aged hearing peers across academic domains, including math proficiency (Pagliaro & Kritzer, 2013; Zarfaty, Nunes, & Bryant, 2004; Edwards, Edwards, &Langdon, 2013). In order to promote successful integration in a mainstream educational setting and minimize the risk of academic delays, it is essential that early learning experiences build on academic foundations (Yoshinaga-Itano, 2004, Cole & Flexer, 2011). This project focused on 1) the best practices of mathematics for early education, 2) delays children who are DHH face in mathematics, 3) improving math-based experiences for children who are DHH, and 4) the positive effects of parent involvement.

The project culminated in the development of age-appropriate math units that facilitated home-based math experiences for preschool children. Computational math units were given to parents for implementation and feedback. Parent feedback was received as a potential guide for product development and future revisions. This project concluded in math resources that facilitate parent-child learning opportunities to promote kindergarten readiness and improve math outcomes in children who are DHH.

Best Practices in Early Childhood Mathematics

In the early to mid-20th century the teaching of math was not seen as developmentally appropriate for early childhood education. Thorndike (1922) and other learning theorists of the 20th century thought that children were not cognitively ready to handle the process necessary for mathematical thinking and it was not introduced until elementary years (Hachey, 2013). Piaget's research in the 1960s explored mathematics with kids before elementary school. By the end of the 20th century a fundamental change in thought occurred, from what children do not know about math, to what they do know, transforming the view on the importance of early childhood mathematics. It is recognized that young children have the potential to demonstrate substantial knowledge in math skills before kindergarten entry (Claessens & Engel, 2013; NAEYC & NTCM, 2002). A joint position statement published by the National Association for the Education of Young Children (NAEYC) and the National Council for Teachers of Mathematics (NCTM) (2002) stressed early childhood mathematics and proficiency in early mathematic skills (one-to-one counting, identifying numerals, recognizing geometric shapes, and recognizing patterns) are seen as essential for subsequent school success (Claessens & Engel, 2013; NAEYC & NTCM, 2002; NCTM, 2007; NMAP, 2008; NRC, 2009).

Common Core Standards

The Common Core Standards were developed as a guide for educators in providing commensurate academic instructions creating consistent expectations by identifying necessary knowledge and skills. The Common Core Standards were developed for grades K-12, but caused a substantial impact on early childhood education, prompting states to develop Early Childhood Core Standards consistent with national standards. Early childhood classrooms require a rigorous academic foundation to ensure that children are prepared for kindergarten entry (NAEYC, 2012; National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

Utah's Early Childhood Core Standards identified preschool foundational standards, along with kindergarten readiness standards for children ages 3-5 (Utah State Office of Education, 2013). One of the six content areas is mathematics. Given that math is recognized as a critical component of the educational curriculum, the establishment of strong mathematical skills is necessary to remain consistent with national recommendations.

Computational Math

Computational mathematics in early childhood education includes counting, emergent algebraic and geometric thinking, and measurements (NAEYC & NCTM, 2002). Targeting and developing computational mathematical concepts leads to development of more complex skills and expands on vocabulary and increases language levels (Utah State Office of Education, 2013). Development of mathematical skills is a continuum that becomes more complex with time and mathematical abilities are crucial in the modern day work force (Edwards, Edwards,

&Langdon, 2013). It is critical to target computational mathematic skills early by providing a strong focus on foundational skills and preparing children for future educational success.

Math and Kindergarten Readiness

Math skills measured at kindergarten entry provide a more accurate predictor for later success across academic domains (math, science, and reading skills) than literacy skills measured at the same age (Claessens & Engel, 2013). At kindergarten entry, children should be prepared with foundational skills in language arts, math, science, social-emotional, creative arts, and physical abilities. In the area of math, Utah's Early Childhood Core Standards identifies five concepts or domains. It is anticipated that upon kindergarten entry children possess an understanding of counting, algebraic thinking, measurements and data analysis, and geometry.

Kindergarten readiness standards anticipate that a child can demonstrate age-appropriate proficiency across the following areas:

- Counting: correspondence counting 1-10, associating written numbers.
- Algebra: exploring addition and taking away concrete objects, providing the total number within a set, combination of objects in various sets, and duplicating simple patterns.
- Measurements: describing measurable attributes of objects (length, weight, size, distance) and comparing objects using measurable attributes
- Geometry: identifying shapes by name within the environment (regardless of orientation), recognizing dimensions of shapes (flat vs solid), creating basic shapes, and combining shapes to create new shapes.

Children who are Deaf and Hard-of-Hearing

Children who are deaf and hard-of-hearing (DHH) are at risk for speech, language, and academic delays due to insufficient access to sound (Madell & Flexer, 2008). With the availability of newborn hearing screening and advanced hearing technology (e.g. hearing aids, cochlear implants, and assistive listening devices) the landscape of deaf education has changed, with many children who are DHH developing listening and spoken language as their primary mode of communication and being educated in mainstream settings. A listening and spoken language (LSL) approach places a strong emphasis on the development of spoken language and literacy skills through regular listening opportunities. Many children who are DHH develop language and academic skills comparable to their same-aged hearing peers (Yoshinaga-Itano, 2004). Despite strides in hearing technology and the increased number of those developing LSL, the use of hearing aids and cochlear implants do not replace the natural ear and children cannot be assumed to have auditory perception skills comparable to a hearing child. A strong language and academic foundation needs to be established for them to develop mathematical skills commensurate with their typically hearing peers. Children who are DHH benefit from early, additional focus across all core academic areas, including mathematics (Antia, Jones, Reed, & Kreimeyer, 2009; Cole & Flexer, 2011).

Gaps in Mathematics for Children who are Deaf and Hard-of-Hearing

Hearing loss has been associated with delays in mathematics. A historical review of research shows evidence of delays in mathematics for children who are DHH as compared to their typically hearing peers (Nunes & Moreno, 2002; Traxler, 2000, Wollman, 1965; Pagliaro & Kritzer, 2013, Zarfaty, Nunes, & Bryant, 2004, Edwards, Edwards, &Langdon, 2013).

An older study (Wollman, 1965) determined that students, ages 14-16, who were DHH, demonstrated delays in arithmetic on an average of 2.5 years in students. Nearly two decades later (Wood, Wood, Kingsmill, French, & Howarth, 1984) students who were DHH, ages 16-17, were shown an average delay of 3.4 years in mathematics as compared to their hearing peers. Traxler (2000) confirmed the delays again in a similar study and reported delays in problem solving and procedures.

The achievement gap in mathematics faced by children who are DHH may be evident as early as preschool entry (Krizter, 2009). Waiting to tackle the problem can create lifelong deficits. Children ages 4-6, who are DHH were tested on math knowledge and skills using the Test of Early Mathematics Abilities (TEMA-3). No study participants achieved higher than average based on the normative ranking, and the majority scored significantly below average (Kritzer, 2009). The results indicate that delays were present in over 60% of the participants before the start of formal schooling. Findings suggest the need for preschoolers with hearing loss to receive more contextually based mathematics opportunities in areas such as problem-solving, quantities, and purposeful counting.

Pagliaro and Kritzer (2013) acknowledge the limited research available on early performance of foundational math skills for children who are DHH. Their research was able to identify the delays in mathematics as early as preschool. Children who are DHH demonstrate strengths in geometry, but weakness in problem solving and measurement. It goes further in addressing the level of understanding in other areas like patterns, reasoning, and algebra. Children who are DHH may be missing the foundational skills necessary to address mathematical concepts in the Common Core Standards. Pagliaro and Kritzer (2013) identified how the delays faced by children who are DHH are even more apparent when measured by

Common Core Standards. For example, the Common Core Standards anticipate that during kindergarten children will develop the ability to count to 100 by both 1s and 10s. Pagliaro and Kritzer (2013) found less than 50% of students who are DHH were counting to a number appropriate for their age benchmarks. Missing this skill creates a domino effect and interrupts other skills targeted in the Common Core Standards.

Improving Math-Based Experiences for Children who are DHH

Children who are DHH learn better within a mainstream classroom, which is target placement for all children (Antia, Jones, Reed, & Kreimeyer, 2009). In order to prepare children who are DHH for mainstream educational settings, foundational mathematics should be targeted at an early age. In developing computational mathematic skills with children who are DHH a few areas should be considered: creating quality of mathematic opportunities, authentic learning opportunities, incidental learning, and the use of listening and spoken language strategies.

Creating Quality Mathematic Opportunities

A joint position statement, *Early Childhood Mathematics: Promoting Good Beginnings*, developed by the National Association for the Education of Young Children (NAEYC) and the National Council of Teachers of Mathematics (NCTM) (2002) reflects on the value of early mathematical experiences, providing several guiding principles to support young children's mathematics. NAEYC and NCTM suggest professionals should enhance children's natural interests in math, build on a child's experience and knowledge, follow developmental norms, and actively introduce mathematical concepts in a variety of experiences and teaching strategies. The NAEYC and NCTM see the need to connect mathematical curriculum between the early childhood years and kindergarten, creating a seamless education for children. They uphold that

math in the early childhood setting (specifically ages 3-6) needs to be high-quality, challenging, and accessible. According to the NAEYC and the NTCM, high-quality math needs to be more than drill and practice, but rather integrated into daily routines and activities.

Authentic Learning

High-quality math must build new concepts on existing knowledge and experiences. Educators should avoid utilizing drill and practice methods of instruction, as this generally results in frustration and lack of interest (NAEYC & NCTM, 2002; Pagliaro & Kritzer, 2013). Rather, math opportunities should be integrated with meaningful activities, creating authentic learning experiences for children. Authentic learning experiences are engaging for children and provide learning experiences that develop long lasting skills. Children are able to learn more information, faster, and with a deeper understanding when it is generalizable throughout their day. In mathematics authentic learning would allow children to explore, discover, discuss, and meaningfully construct mathematical concepts and relationships in contexts that involve real-world problems and projects that are relevant and interesting to the learner.

Providing math through home-based opportunities generalizes the skills and concept, providing an opportunity for parents to extend and develop math concepts outside the classroom. Therefore, not only does math need to be actively taught, it needs to be integrated across all educational domains.

Incidental Learning

It is said that children who are DHH may struggle with mathematics because of difficulties in learning incidentally (Zarfaty, Nunes, & Bryant 2004; Nunes & Moreno, 2002). Incidental learning is the process of learning without the intention to do so (Bandura & Huston,

1961). Incidental opportunities occur naturally within the environment (overhearing conversations, TV, radio). Through incidental learning children have the ability to acquire skills ranging from academic to social. Children who are DHH have less constant exposure to information (Krtizer 2009) and miss incidental learning opportunities because of poor listening environments (background noise, distance, etc.). The difficulty children who are DHH face with incidental learning is a consideration in the difficulties they face in mathematics (Wollam, 1965; Nunes & Moreno, 2002). Explicitly targeting concepts is crucial within LSL deaf education (Brown, Waring, & Donkaewbua, 2008). With the explicit teaching of concepts, children who are DHH have the opportunity to acquire the same skills as their typically hearing peers.

Listening and Spoken Language Strategies

When working with children who are DHH, we want to think in terms of using listening opportunities to motivate language. Listening opportunities can be optimized by incorporating listening and spoken language (LSL) strategies. LSL strategies promote thinking in children who are DHH (Estes, 2010; Garber, 2012).They allow for children to make auditory, language, and experiential connections by presenting information in an "auditory first" fashion, meaning information is presented auditorily prior to any visual cues. LSL strategies are easily integrated into a daily routine with all children. Examples include wait time, providing the child adequate time to formulate an answer; acoustic highlighting, saying a specific word with added emphasis; auditory closure, open-ended sentence/statements; extension, repeating the child's utterance with additional and related content.

Parent Involvement

Early knowledge is greatly affected by the environment in which children grow (Bodrova & Leong, 2007) and the opportunity for success in a mainstream classroom is amplified through parent involvement (Skwarchuk, 2009; Kritzer & Pagliaro, 2012). Cognitive development is enhanced when children are met with early, positive and engaging interactions with parents and these positive interactions aid children's mental ability to think and remember. Parent involvement in preschool mathematics education has proven to have an impact on increasing kindergarten readiness (Skwarchuk, 2009; Kritzer & Pagliaro, 2012). Parent involvement provides additional support to reinforce children's educational opportunities, which lead to future success.

Although they are not always cognizant of it, parents stimulate their child's math knowledge by asking questing, asking for explanations, and pointing out patterns, relationships, and strategies. By doing this they are informally contributing to mathematical learning opportunities (Anderson, 1997; Kritzer, 2009). However, it has been found that parents of children who are DHH made limited references to their children about mathematical concepts in the areas of numbers and/or counting, quantity, time and/or sequence, and categorization (Kritzer 2009), limiting the informal learning opportunities for their child. Parents play a key role in ensuring multiple, continued practice opportunities outside of the classroom. Parent involvement creates home-based opportunities to give children who are DHH the opportunity for practice within a more naturalistic setting. The success of children who are DHH in academic settings is traced to family variables such as involvement, knowledge of educational setting and program, assistance on homework, and the encouragement and expectations of the child (Anita, Jones, Reed, & Kreimeyer, 2009).

By capitalizing on parent involvement, the development of computational math skills can be substantially enhanced through home-implemented supports for children to gain math concept experiences within their daily activities. Preschool children are in a stage of rapid development and growth. They are naturally curious and actively seeking to understand their surroundings. When parents provide optimal, quality educational opportunities outside of the classroom, it amplifies learning experiences. Empirical research supports that any amount of parent involvement with academic work leads to improved academic performance (Brooks, 2013). Embedding mathematical concepts into meaningful context for young children allows for long term learning to occur multiple times in predictable and functional ways (Woods, Kashinath & Goldstein, 2004).

Project Defense

Mathematic skills build on a continuum. Building on early, foundational skills is necessary for later educational successes. This graduate thesis project culminated in the development of parent-based, home-implemented math units designed to support the development of kindergarten readiness skills, as outlined in Utah's Early Childhood Core Standards (UECCS), for children who are deaf and hard-of-hearing. The math units were meant as a guide for parents to enrich opportunities for high-quality, authentic mathematical interactions within daily routines.

Project Focus

The focus of this project was to create parent-based, home-implemented math materials to aid in the development of foundational kindergarten readiness math skills for children who are DHH. Creating parent-based, home-implemented materials provided parents the tools and competencies to naturally embed math within their typical day, expanding their child's exposure

to the concepts. Songs, games, and books allowed for concrete examples of the concepts and vocabulary, while the carryover ideas helped to expand concepts across all activities. In addition, listening and spoken language strategies were embedded in units to tailor them more closely to children who are DHH.

Project Description

Math Units

Each math unit was organized into an accordion file. Each file folder contained an introductory letter, listening and spoken language strategies, and a list of contents specific to each unit. Further, units contained games, songs, books, and additional carry over ideas for expanding concepts into daily activities. Each piece contained instructions that explained the concept, incorporated questions to ask, vocabulary, and suggestions on including listening and spoken language strategies (e.g. sabotage, auditory first, closed set, etc.). Printouts of all strategies and activities were included for each family to keep and continue to utilize following the return of the unit.

The four concepts were organized into two units; one included counting & algebra and the second included geometry & measurements. A description of contents and intended purpose is provided below:

Unit 1: Counting and Algebra

- Games/Activities:
    - Monster Count and Watermelon Count: Folder games targeting correspondence counting and associating written numbers.

- Experience Book: Count everyday objects into groups (1-10) and provide representation in the experience book template (drawing, taking pictures, gluing items, etc.).
- Lego Stack: Folder game targeting adding and subtracting from a stack of blocks.
- Pattern Book: Book that targeted duplicating, extending, and creating patterns at increased levels of difficulty (abab, aabb, abc).

- Song:
  - 5 Little Speckled Frogs: Subtracting by one using a popular children's song with an added manipulative for visual support.
- Books
  - *Ten Apples Up on Top* by Dr. Seuss: Highlighted correspondence counting and identification of the next number in the counting sequence.
  - *Pete the Cat and His Four Groovy Buttons* by Eric Litwin: Demonstrated subtraction as Pete lost his buttons.
  - *10 Little Monsters*: A free book online that targeted subtracting by one form 10 down to one.

Unit 2: Measurements and Geometry

- Games/Activities:
  - I Spy: Make a game of identifying objects and using measurable terms. Incorporate measurement terms by comparing objects.
  - Measurement Experience Book: Children compare objects to themselves (e.g., by height, weight, length, etc.) and document the items in their book.

    - Popsicle Shapes: Children create shapes (square, triangle, rectangle, and hexagon) using Popsicle sticks and explored what they could create by combining shapes.
    - Shape Hunt: Making a game of identifying 2D and 3D shapes in all orientations as found in the environment.
    - Geometry Experience Book: Children take pictures of the shapes they find hidden in everyday objects.
- Song:
    - Measurement Song: A song created to incorporate measurement terms outlined in the UECCS.
    - Geometry Poem: Compared 3D shapes (spheres, cones, cubes, etc.) to tangible objects in the environment.
- Books:
    - The Best Bug Parade by Stuart J. Murphy: Looked at measuring the length of different bugs, incorporating terms aligned with UECCS.
    - *Mouse Shapes* by Ellen Stoll Walsh: Incorporated shapes at all angles and demonstrated using shapes to create new pictures or objects.

Discussion

This project addressed important mathematical concepts for children preparing to enter kindergarten, as highlighted in the UECCS. Parent involvement in preschool mathematics education has been shown to have a positive impact on a child's kindergarten readiness skills (Skwarchuk, 2009; Kritzer & Pagliaro, 2012) and using these math units provided exposure to important math skills in daily activities.

The materials were designed to be parent-based and home-implemented. Hands-on materials provided in the units allowed parents to learn important skills and strategies associated with each mathematical concept. The knowledge and tools gained through the materials supported their ability to naturally incorporate mathematics throughout daily activities. Using the child's natural environment and providing exposure to math concepts using their natural interests promotes authentic learning opportunities, a key aspect in early math learning (NAEYC & NTCM, 2002).

The incorporation of listening and spoken language strategies further supported parents in embedding math in daily activities. LSL strategies enhance the opportunity for children to make auditory, language, and experiential connections. And when high-quality, authentic learning opportunities incorporate LSL strategies, a child is receiving multiple exposures to math concepts and skills in a manner that promotes thinking in children who are DHH. By receiving repeated opportunities, children who are DHH are supported in overcoming the difficulty faced with incidental learning. These strategies can be used across all environments and interactions that parents engage in with their child.

Parent Feedback

Feedback was acquired using a parent feedback form (see Appendix A). A total of 8 families used at least one mathematic unit for a period of two to four weeks. Two requested additional time with the units. One of the families is currently receiving tele-intervention services and expressed excitement in the opportunity for additional educational resources. The remaining families have children enrolled in Sound Beginnings Preschool at Utah State University.

Overall, parents expressed appreciation towards their experience with the math units (see Appendix B for direct quotes from the family). One mother said she appreciated the

incorporation of additional strategies provided with the song 5 Little Speckled Frogs. She specifically said "this is a song I have sung with my other children, but I never considered how slowing down and breaking it apart would allow for so much math. We even used the same concepts with 5 Little Monkeys."

Another parent mentioned that initially the units seemed daunting due to their large appearance. However, "once we got started it all just went so quickly." All parents stated the organization of the units was easy to follow.

Another problem parents encountered was the difficulty level. One parent expressed that an activity provided was too easy for their child. Another family explained further that even though the materials were easy for their child, it increased their awareness on expanding math language and opportunities in their child's areas of interest. On the other end, two parents said the Lego Stack was more challenging for their child. One parent mentioned that starting with a stack of blocks and adding/subtracting from it was difficult. They found a way to adapt the game so they were still targeting the same skills and vocabulary.

Multiple parents expressed that the units provided more awareness of math concepts and opened their eyes to how easy it was to expand math into their daily routines. They all shared ways in which they incorporated math throughout their daily activities and not two families shared the same ideas. One parent shared that her child has expressed in increased interest in math and is counting everything. "She created paper cell phones for everyone and placed all the numbers in order." Another parent with a background in teaching and math wrote, "As a math specialist, I was fascinated by this project and how the math concepts could assist my daughter."

Future Use

Six total units were created; three copies of each unit. Four copies will be given to the Sound Beginnings Preschool to be added to growing collection of parent resources. One copy will be provided for the Utah School for the Deaf and Blind.

Personal Take Away

I had the unique opportunity of watching a mother and her child use portions of a unit during a tele-intervention session. It was incredible to see them engaged in the activities and to watch the child's excitement and desire to pull out more activities. I was able to coach the mother through the process, giving her ideas to further enhance the math concepts and to point out the great things they were already demonstrating. In the weeks following, it has been incredible to see the spike in math language and awareness from this particular child.

I was my biggest critic throughout the process. It felt as if some concepts were being repeated too frequently between activities, units were too bulky, some areas weren't explained well, etc. However, through parent feedback I learned they felt very differently about it. Parents were very grateful for the quality of the materials and expressed appreciation for the variety, which allowed them to find at least one activity that spiked their child's interest. The feedback was overall positive and they provided some great examples of how they have carried the skills over in their family routines. There were some great suggestions as well. It was mentioned that initially the units seemed daunting due to their size. Possibly shortening or simplifying the units would make them more visually appealing to parents upon first glance. Overall, I feel the units were a fun, beneficial way to increase parent awareness of math opportunities within their daily activities.

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Appendix A

Thank you for participating in the Counting & Algebra Activities over the last few weeks. Please respond to the following questions and be as specific as possible. Your feedback is very important in helping improve the materials for families. For this project you received a packet of math related materials to use with your child.

Choose the activities you completed with your child from the list below:

- ☐ Monster Count
- ☐ Lego Game
- ☐ 5 Little Speckled Frogs
- ☐ Experience Book
- ☐ Book: Pete the Cat
- ☐ Watermelon Count
- ☐ Book: Ten Apples
- ☐ Patterns
- ☐ Additional Ideas

Were these materials easy for you to use with your child? Why or why not?

Were any of the activities difficult to complete with your child? If so, please describe what could have made that activity more successful.

Do you believe that using the math activities was beneficial to your child? If so, please provide an example of your child's response to their favorite activity.

Favorite Activity:

Child's Response:

Did this activity make your family more aware of the math concepts you were already using in your home? If so, please describe a way your family was using math in everyday activities.

Appendix B

Feedback on the ease of use
Went along with materials we already covered/mastered earlier in the year! Great review and reinforcement. Well organized too.
These materials were visually appealing and my 2 year old was even able to do some of the activities.
Easy to use because they were self-explanatory. The concepts were simple. It made family time fun and educational.
Initial appearances of the binder made the units overwhelming, but great organization. Units were very easy to use. Directions were clear, well organized.
Materials and instructions were so simple! Thank you for laminating. They were so fun; she could do them independently pretty quickly. LOVED the books-we went and bought Pete the Cat.
Feedback on any difficultly faced with activities and areas to improve
The language level and concepts on the Lego game were a little high for her. Thank you for the varied levels in the pattern book.
No! They were awesome; it's perfect when they are interactive.
None of the activities were difficult to complete, but in order for my child to grasp the song or poem it required repetitious use.
Some activities were far too easy for him. He was finished with the counting in no time.
She had hard time beginning with stack and taking away. Moving on the game board while performing the adding/subtracting blocks was difficult.
Feedback on the benefits and favorite activities
Loved the little monster book she could count down. [She] said patterns were 'really hard', so she like monster book best. I think the patterns were great practice for her.
Connected to interests he already had. Engagement with counting numbers addition and subtraction is always beneficial for children.
[She] counted backwards using Pete the first time—it also really helped her get zero better The watermelon seed game was so versatile—she put them in order from little-big and big-little in addition to matching.
The book Best Bug Parade was a hit. They loved showing how things were bigger, longer as we read the book.

Feedback on the ways it made families more away of math
Thanks for bringing awareness to these areas. As a parent I like feeling able to expand their lessons.
It helped me to remember to point out these concepts more at home.
Before we weren't pointing out or making patterns. Now, she is making and following a lot more patterns.
Additional Feedback
As a math specialist, I was fascinated by this project and how the math concepts could assist my daughter. [We] spent a good deal of time on the pattern game and I was truly amazed by the growth she showed.
I like the fact the games were engaging for both girls and boys, and that they involved music, play, and literacy.