

Numeracy in Early Childhood Settings

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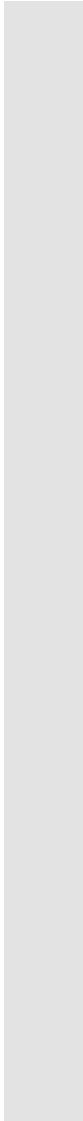

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National Council of Teachers – of Mathematics (NCTM) Position

- Young learners' future understanding of mathematics requires an early foundation based on a high-quality, challenging, and accessible mathematics education
- Young children in every setting should experience mathematics through effective, research-based curricula and teaching practices
- Teachers require the support of policies, organizational structures, and resources that enable them to succeed



“People forget that math is a daily
experience; it is part of everything
you do.”

Veronica Ufoegbune

Problem Statement

- Since the 1970's U.S. students' performance has revealed an overall level of mathematical proficiency well below what is desired and needed
- Despite research showing the crucial importance of math at a preschool level, preschool programs face significant obstacles in implementing an effective math program

Obstacles

- Lack of math content and training in how to teach it among preschool staff. Freedberg, 2012
- Logistics and costs of providing in-service training
- The impact of the budget crisis on providing professional development
- Widespread “math anxiety” among preschool staff who have often struggled with math earlier in their careers

Research

- Research on children's learning in the first six years of life demonstrates the importance of early experiences in mathematics
- An engaging and encouraging climate for children's early encounters with mathematics develops their confidence in their ability to understand and use mathematics
- Positive experiences help children develop dispositions such as curiosity, imagination, flexibility, inventiveness, and persistence, which contribute to their future success in and out of school (Clements & Conference Working Group, 2004)

Research

- Duncan (2007), and fellow researchers published a paper showing that early math concepts, such as knowledge of numbers and measurement, were "***the most powerful predictors of later learning,***" even more than reading and writing.
- Literacy and math should go hand in hand in early childhood settings
- Both concepts should be integrated in all learning and everyday areas and activities (such as counting the numbers of steps from the classroom to the playground) Veronica Ufoegbune

Research

- We now have a fuller picture of the mathematics young children are able to acquire and the practices to promote their understanding
- This knowledge is not yet in the hands of most early childhood teachers in a form to effectively guide their teaching
- Many early childhood programs have a considerable distance to go to achieve high-quality

Basic Math Concepts Necessary by Kindergarten

- Even for young children, math is more than just a numbers game. Math has many dimensions, including:
- Numbers and Operations
- **The language of math**
- Spatial relations
- **Geometry**
- Algebraic thinking
- **Displaying and analyzing data**
- Measurement and time

Solutions: Where do we begin?

- We can start by learning from some of the research studies on early math acquisition
- Understand and respect how preschool students naturally explore and experiment with math concepts
- Identify effective math programs
- Tailor experiences and instruction that will propel them towards success
- Math is best taught at both home and at school.

Solutions:
Where do we
begin?

The power of a
good
preschool
math program

Ensure that practices that have proven to be effective in promoting math learning are in place:

- **Collect baseline information (ELQA - Math)**
- **Make math real**
- **Learn math by living math**
- **Forge parent-teacher partnerships**
- **Children will need different types of instruction and support**
- **Show me the research!**

To support excellent early mathematics education, institutions, program developers, and policy makers should

- Create more effective early childhood teacher preparation and professional development
- **Use collaborative processes to develop well-aligned systems of appropriate high-quality standards, curriculum, and assessment**
- Design institutional structures and policies that support teachers' ongoing learning
- **Provide the resources necessary to overcome the barriers to young children's mathematical proficiency**

Family Math Initiatives

- Public awareness campaigns, distribution of materials in ways similar to the successful Reach Out and Read initiative
- Computer-linked as well as school-based meetings for families
- Family Math Nights, and take-home activities such as mathematics games and manipulative materials tailored to the ages, interests, languages, and cultures of the children

Family Math Initiatives

- A positive attitude toward mathematics and a strong foundation for mathematics learning begin in early childhood
- To realize this vision, educators, administrators, policy makers, and families must work together—raising awareness of the importance of mathematics in early education

Questions and
Comments

Thank you!

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References

- ESSO Family Math Project (Nancy Chapple, Judi Waters, Linda Adams): community-based initiative for families who want to help their children experience success in mathematics. Families learn to use everyday activities that can be adapted for children in child care settings (two books can be downloaded)
- www.edu.uwo.ca/essofamilymath
- Family Math Fun! Kate Nonesuch
www.nald.ca/library/learning/familymath/cover.htm

References

- A growing body of research supports the implementation of curricular resources and program standards for mathematics for early childhood learners (Richardson, 2000; NAEYC & NAECS/SDE, 2003; Clements, Sarama, & DiBiase, 2004; NAEYC, 2009; National Research Council, 2009). The National Association for the Education of Young Children (NAEYC) and the National Association of Early Childhood Specialists in State Departments of Education (NAECS/SDE) recommend the implementation of "curriculum that is thoughtfully planned, challenging, engaging, developmentally appropriate, culturally and linguistically responsive, comprehensive, and likely to promote positive outcomes for all young children" (2003).