Building Strong Foundations: The Importance of Numeracy in Early Education Programs

Children & Families in Early Education Committee Meeting
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Imelda Mendez - Principal, Alexandria Early Education Center
Hewan Negussie-Early Education Teacher, Alexandria Early Education Center

Math In Early Education

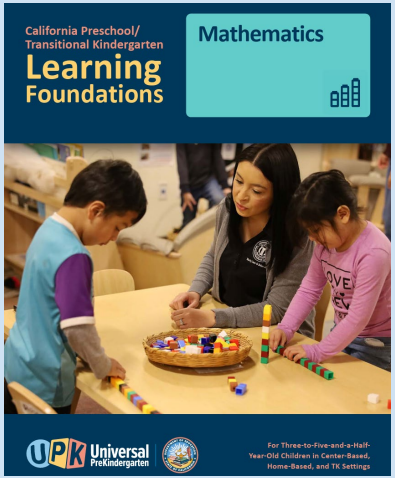
Focuses on developing foundational math skills like counting, sorting, identifying numbers, and understanding basic geometric shapes, primarily through play-based activities, to build a strong "number sense" which is crucial for later mathematical understanding and problem-solving abilities; this includes concepts like quantity, patterns, and spatial awareness, all introduced in a concrete and hands-on manner.

Preschool Transitional Kindergarten Learning Foundations

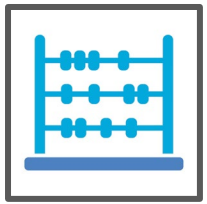
Mathematical Practices apply to children 3 to 5 ½ years of age (for preschool and Transitional Kindergarten)

1. **Make sense of problems and persevere in solving them.**
   Apply mathematical thinking to solve problems in everyday activities and interactions. Persist and try a variety of ways to solve a problem.
2. **Reason abstractly and quantitatively.**
   Reason about abstract mathematical ideas (for example, quantity, equality) using concrete objects (for example, "I have two cars and you have two. We have four cars."). Over time, relate to mathematical problems in more abstract ways (for example, two plus two equals four).
3. **Construct viable arguments and critique the reasoning of others.**
   Construct arguments about solutions, explain reasoning, and think critically about the solutions of others.
4. **Model with mathematics.**
   Use models (for example, drawings, constructions, modeling with their own bodies) to illustrate thinking and solve mathematical problems.
5. **Use appropriate tools strategically.**
   Use a variety of tools to solve mathematical problems (for example, a piece of string, a ruler, or a scale for measuring or ordering objects).
6. **Attend to precision.**
   Apply mathematical skills with increased precision (for example, counting, comparing, adding, subtracting).
7. **Look for and make use of structure.**
   Recognize structures and rules in mathematics (for example, all triangles have three sides).
8. **Look for and express regularity in repeated reasoning.**
   Notice patterns and regularity in mathematics (for example, a whole number plus one is the next number in the number list).

Mathematical practices are fundamental for understanding numbers and performing basic operations. They help students grasp the relationships between numbers.



Early Math Skills



One-to-One Correspondence

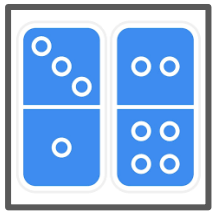
Each object must be matched with a unique number.

Each apple is assigned a unique number.

Stable Order

Numbers must be counted in a consistent sequence, like 1, 2, 3.

Counting songs help maintain a consistent sequence.



Cardinality

Counting five blocks indicates there are five blocks.

The last number counted shows the total quantity.

Early Math Support

- Teachers provide targeted support by integrating math concepts into daily activities.
- Using games and hands-on materials helps reinforce these foundational skills.
- Children learn to recognize and manipulate numbers through play and exploration when they are provided with intentional spaces.

Children are Natural Mathematicians

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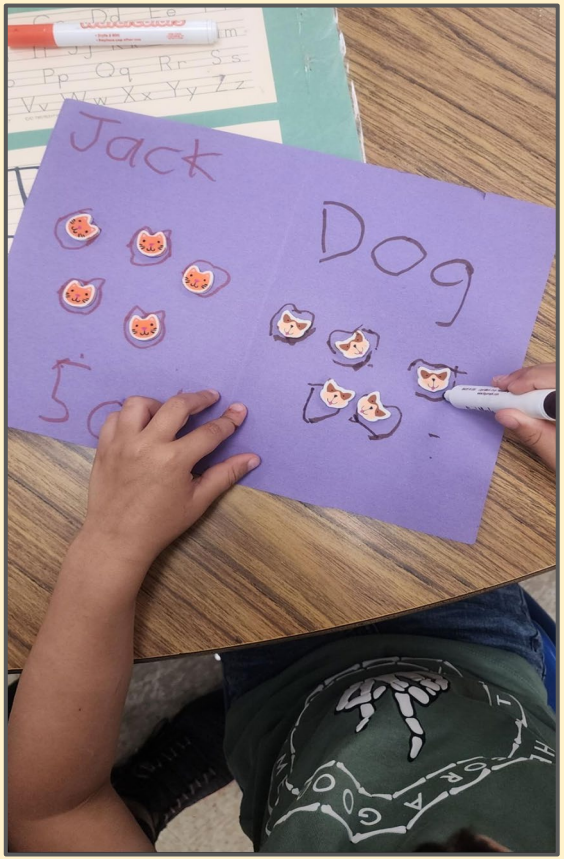
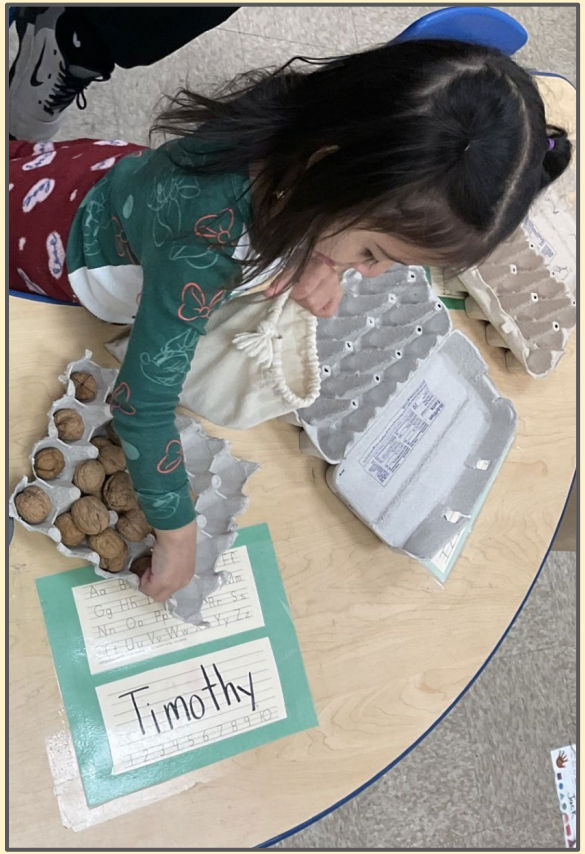
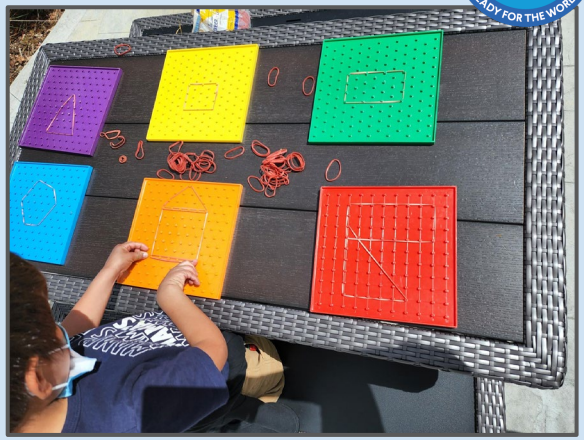
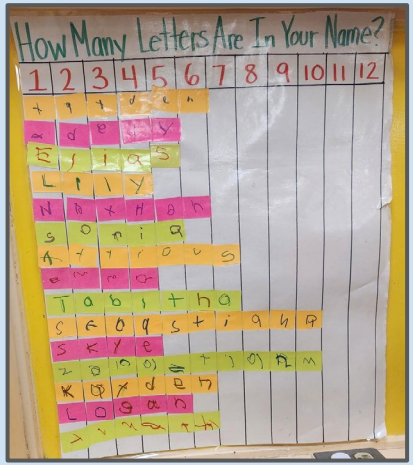




Math Rich Classrooms





Math Rich Classrooms

Desired Results Developmental Profile

Developmental Domain: COG — Cognition, Including Math and Science

COG 3: Number Sense of Quantity

Child shows developing understanding of number and quantity

Mark the latest developmental level the child has mastered:

Responding		Exploring		Building			Integrating
Earlier ○	Later ○	Earlier ○	Later ○	Earlier ○	Middle ○	Later ○	Earlier ○
Responds to people or objects in basic ways	**Responds to changes in the number of objects observed or interacted with**	**Demonstrates awareness of quantity**	**Uses number names, but not always correctly, in situations related to number or quantity**	**Identifies small quantities without counting, up to three**	**Counts up to five objects using one-to-one correspondence; *and* Recites numbers in order, one through ten**	**Shows understanding that the last number counted is the total number of objects in the group**	**Solves simple everyday problems involving numbers by counting up to 10 objects using one-to-one correspondence; *and* Recites numbers correctly, up to 20**
Possible Examples							
• Looks at objects that are hanging from a mobile. • Calms in response to a familiar adult's touch. • Turns toward a familiar adult's voice.	• Attends to one moving toy on a mobile, then to another. • Grasps one toy, and then lets go of it while reaching for another toy that has been introduced by a familiar adult. • Holds an object in each hand, and then touches the two objects together.	• Communicates, "More," during lunch. • Dumps small cars out of a bucket. • Gestures for more when playing with play dough. • Shows excitement when an adult offers another book.	• Communicates, "Dos," ["Two," in Spanish] and holds up two cups in the play kitchen. • Communicates, "One, two, five, one, two," while pointing randomly to objects in a group. • Signs, "Two," in response to the question of "How old are you?"	• Communicates a desire for two apple slices after noticing that a peer has two apple slices. • Communicates, "Three dogs," while looking at a picture of three dogs. • Communicates, "Now I have one bear and you have one," while giving a peer a stuffed bear.	• Counts out loud, "一, 二, 三, 四, 五," ["One, two, three, four, five," in Chinese] saying the next number as the next cup is placed on the table. • Chants numbers from one to 10 in order while waiting for a tricycle. • Counts, "One, two, three," out loud while pointing to each of three squares on a light box.	• Counts ducks in a storybook, "One, two, three, four, five," and then communicates that there are five. • Communicates that there are six rocks after counting a collection of six rocks. • Counts four pencils and says, "Apat," ["Four," in Tagalog] when asked how many pencils there are.	• Counts six chairs, then counts seven children, and communicates, "We need one more chair." • Counts accurately to 20 while marching. • Counts on fingers to determine how many napkins to get so that each child at a table of six has one.

○ Child is emerging to the next developmental level
○ Unable to rate this measure due to extended absence

PTKLF Alignment

Mathematics Domain Alignment and the California Content Standards		
California Preschool Transitional Kindergarten Learning Foundations		**California Common Core State Standards: Kindergarten**
Domain: Mathematics		**Mathematics**
Strand: 1.0 - Counting and Cardinality		**Counting and Cardinality**
Sub-Strand - Counting Principles		
Foundation 1.1 Reciting Numbers		**Counting and Cardinality** • **Know number names and the count sequence.** • **Count to tell the number of objects.** • **Compare Numbers**
Early (3 to 4 ½ Years)	**Later (4 to 5 ½ Years)**	**By the end of kindergarten**
Recite numbers in order from one to ten or higher with no more than a few errors.	Recite numbers in order from one to thirty with no more than a few errors. Count forward from a number other than one.	**Counting and Cardinality** **Know number names and the count sequence.** 1. Count to 100 by ones and by tens. 2. Count forward beginning from a given number within the known sequence (instead of having to begin at 1).
Foundation 1.2 One to One Correspondence		
Early (3 to 4 ½ Years)	**Later (4 to 5 ½ Years)**	**By the end of kindergarten**
Count five objects or more using one to-one correspondence (one object for each number word).	Count ten objects or more using one to-one correspondence (one object.	**Counting and Cardinality** **Count to tell the number of objects.** 4. Understand the relationship between numbers and quantities; connect counting to cardinality. a. When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each name with one and only one object.

Cognitively Guided Instruction Number Talks

- Math talks can help students develop deeper thinking skills.
- Students are encouraged to make connections in mathematics.
- Students are given opportunities to reason about relationships between numbers.

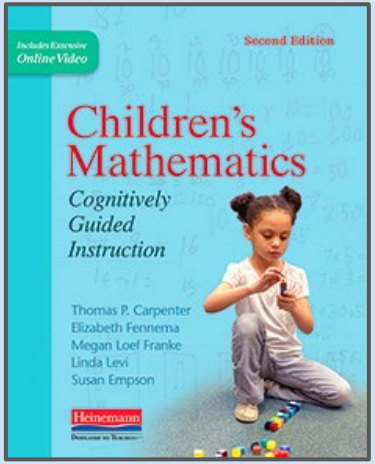
CGI Learning in Everyday Instruction

- Use students' intuitive math knowledge and strategies to guide instruction.
- Provide informal and formal spaces for mathematical thinking.
- Facilitate the development of students' understanding by eliciting discussion opportunities.

Counting and Recording

Facilitating Cognitively Guided Instruction

"...we do not provide specific directions for how to organize a classroom or how to implement instruction. Teaching is a complex problem-solving endeavor. Because of the intimate knowledge that you have of your own students, you are most qualified to make immediate decisions about supporting your students' mathematical learning."



Family Involvement and Engagement

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THANK
YOU