

# Equitable Early Math PK-3

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Early STEAM Symposium  
15 February 2024

# Agenda: Equitable Early Math PK - 3

1. Our Why: Equity
2. Early Math Importance
3. California Mathematics Framework: Big Ideas, Alignment TK-3, Social Justice
4. Developmentally Appropriate Math Experiences PK - Grade 3
5. Multiple Measures of Student Growth PK - Grade 3
6. Family and Community Math Engagement PK - Grade 3

# Change the First Five Years and You Change Everything



# How would early childhood education change the lives of **20 children** living in poverty?

Preschool ● No Preschool ●

## Lifelong Benefits

**Five more adults** would earn more than \$2,000/month by age 27



Car ownership would increase by **37%**



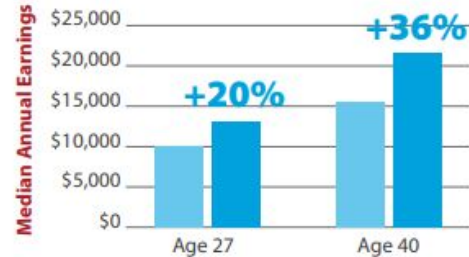
Home ownership would increase by **32%**

**Twice as many men** would raise their own children



**46** Fewer total arrests by age 27 (2.3 per person)

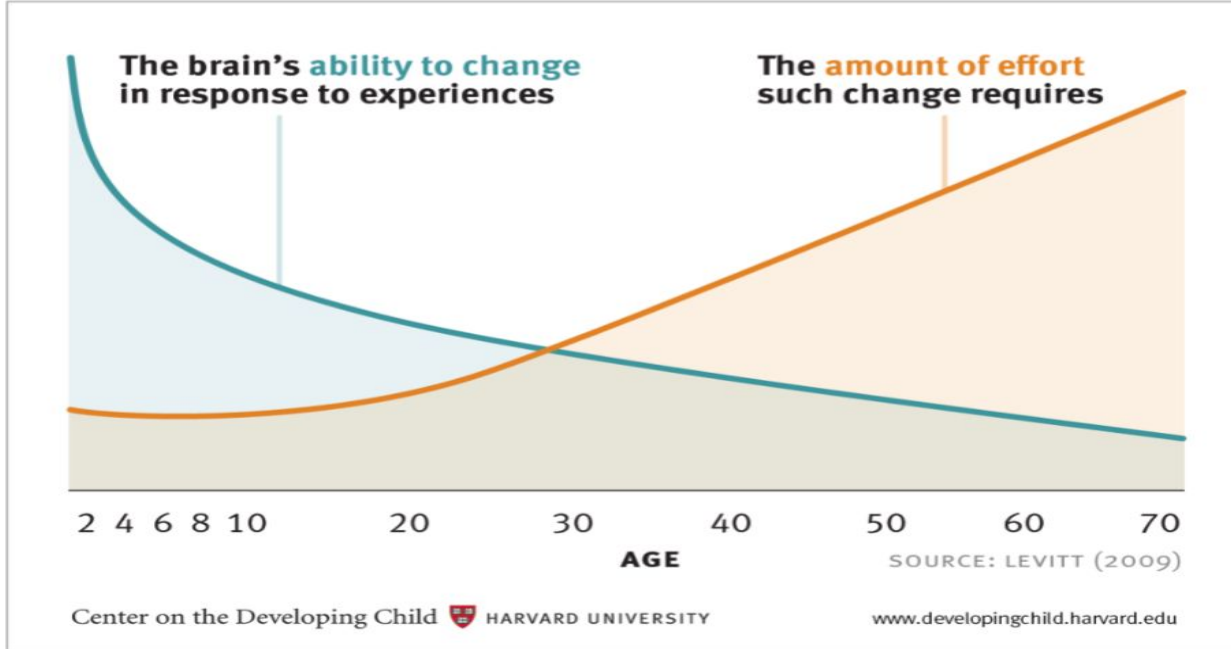
**440** Fewer lifetime months spent in prison (22 per person)



Collaborative Communications Group, Inc.

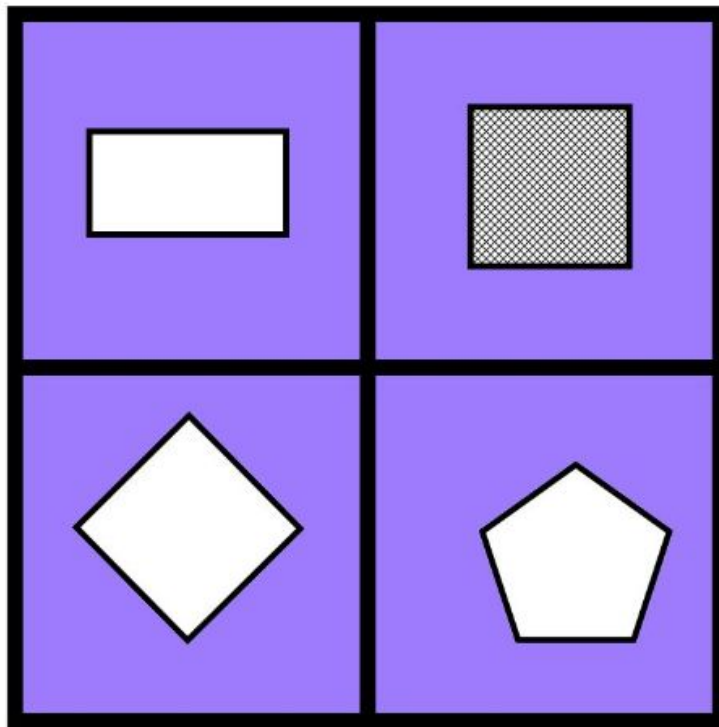
LEADING PRE-K-3 LEARNING COMMUNITIES

# Why Early Learning?

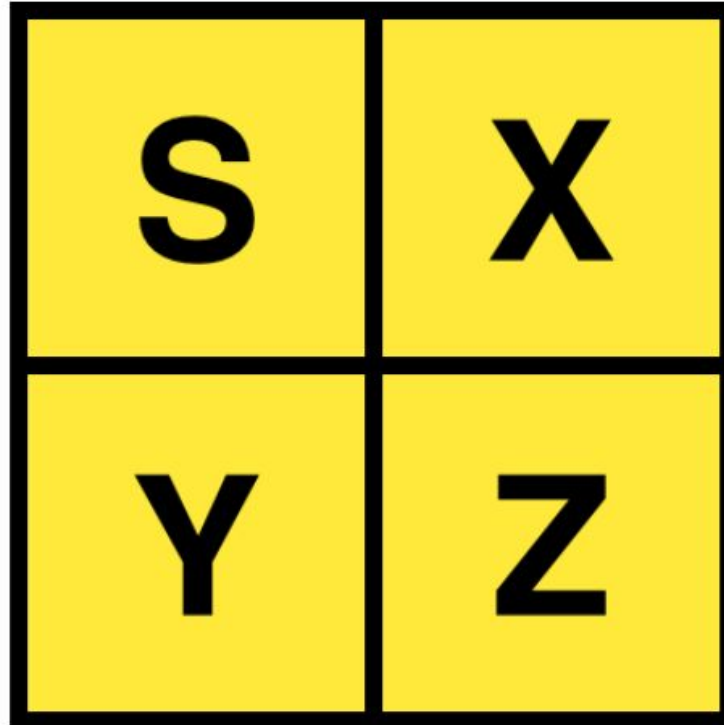


With permission from Center on the Developing Child, Harvard University

# Which One Doesn't Belong?



# Which One Doesn't Belong?





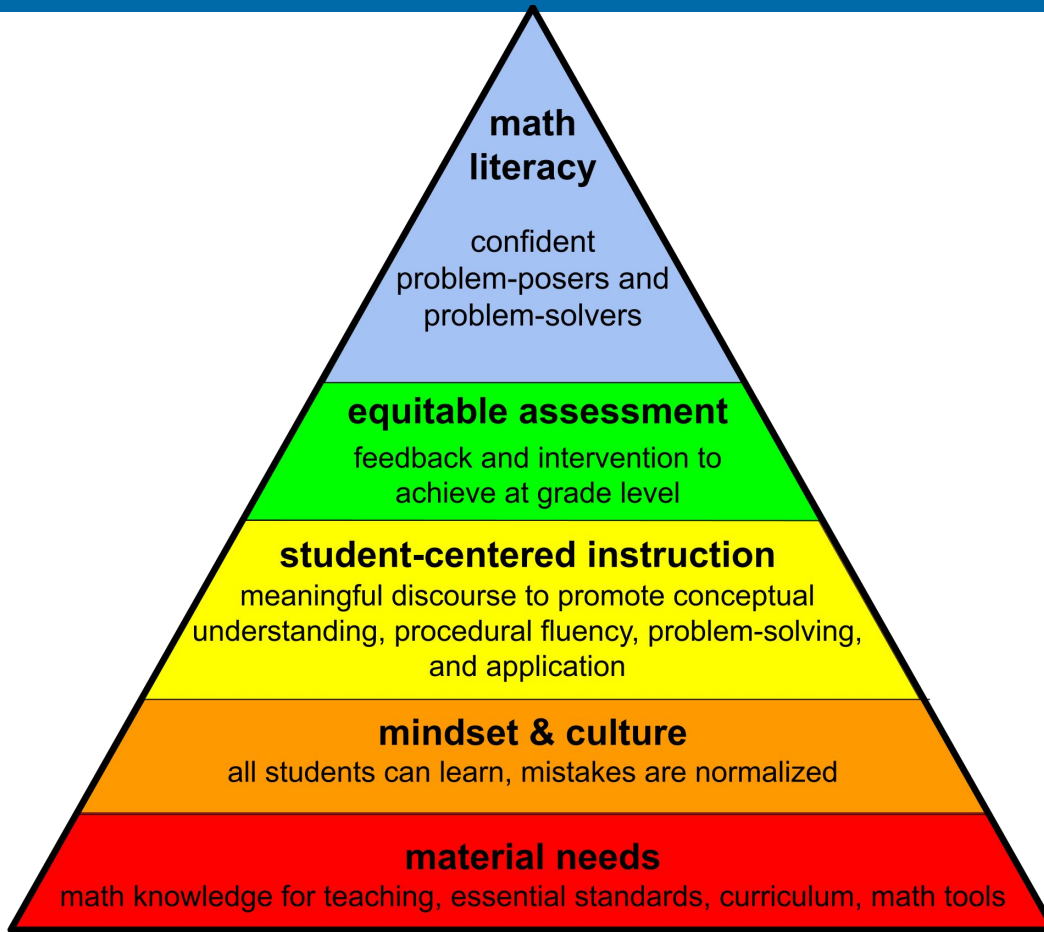
## NCTM Position

Early childhood learning lays the foundation for a child's mathematical journey. Young children flourish when supported in rich learning environments; yet access and outcome vary significantly by social identities. To approach early childhood learning through the lens of equity requires the early childhood education system to acknowledge that the disenfranchisement and discrimination faced by young children, their families, and early childhood educators are systemic. Equitable early childhood education demands culturally and linguistically responsive teaching; developmentally expansive and inclusive practices that respect diversity and value all children's strengths; and the voices of caregivers, families, educators, and children elevated in the decision-making process. Such practices in turn require that early childhood teachers have the support of policies, organizational structures, and resources that enable them to succeed in this challenging and important work.



# NCTM: Math in Early Childhood

- Capitalize on the **wonder and joy** children naturally bring to their mathematical learning and their observations of the world.
- Use curriculum and teaching practices that **build and strengthen children's problem solving and reasoning.**
- Accept and appreciate that **all children have rich and diverse cultural, linguistic, home, and community experience** on which to build mathematics learning.
- **Build partnerships and opportunities for collaboration with students, families, community leaders, and policymakers** to address barriers to educational attainment.
- **Develop systems of reflective practice** across affected parties for equitable access to early care and childhood mathematics learning opportunities.



# Math Hierarchy of Needs

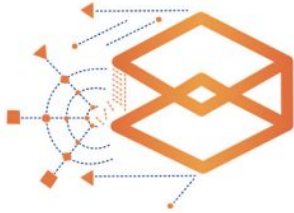
# California Math Framework on Equity

## 3 Dimensions

1. Assets-Based Approach to Instruction
2. Active Engagement through Investigation and Connection
3. Cultural and Personal Connection

## 5 Components of Equitable & Engaging Teaching for All Students

1. Plan teaching around big ideas
2. Use open, engaging tasks
3. Teach toward social justice
4. Invite student questions and conjecture
5. Prioritize reasoning and justification

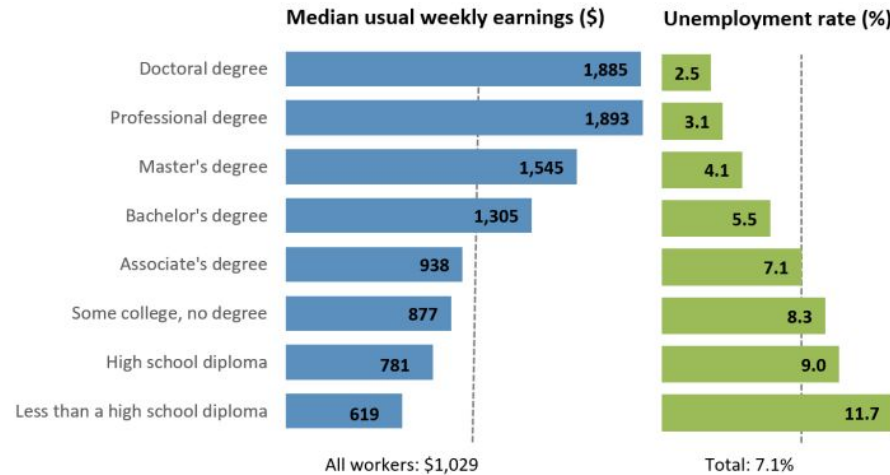


## Youcubed Data Talk Housing/Education/Wages

What do you notice?  
What do you wonder?

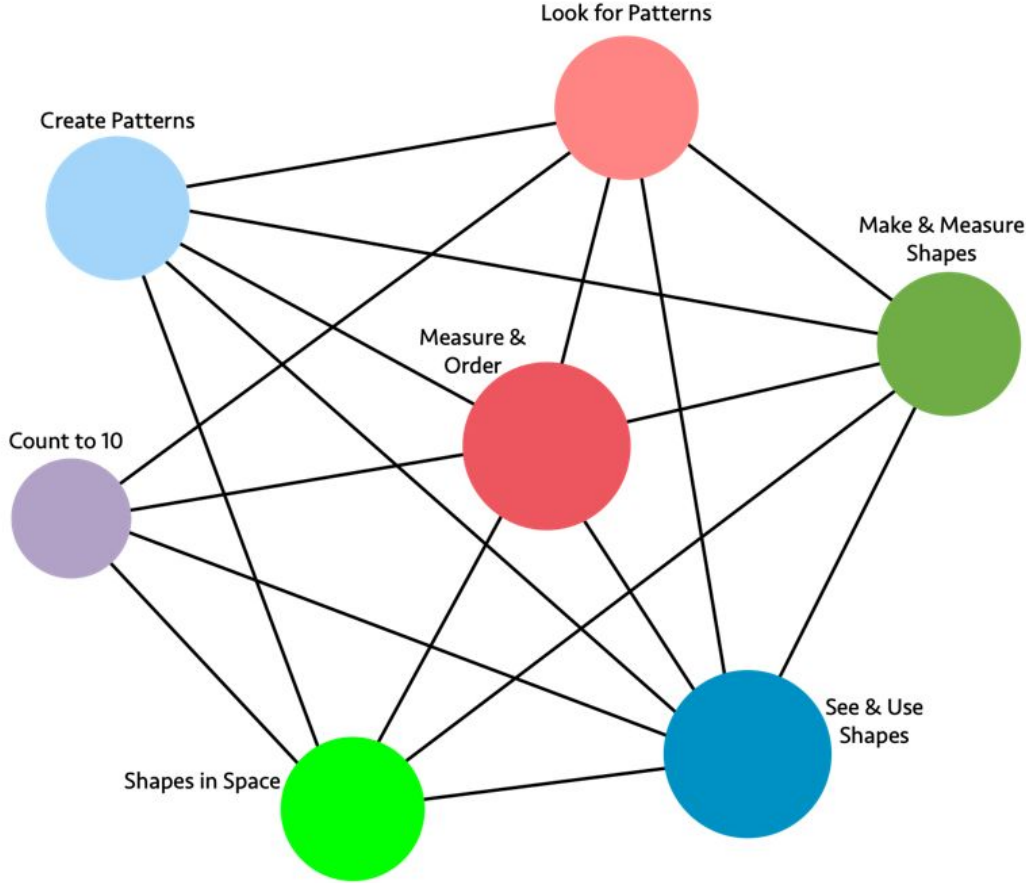
What is going on in this data visualization?

Earnings and unemployment rates by educational attainment, 2020



Note: Data are for persons age 25 and over. Earnings are for full-time wage and salary workers.  
Source: U.S. Bureau of Labor Statistics, Current Population Survey.

# Big Ideas in Transitional Kindergarten



<b>Content Connections</b>	<b>Big Ideas: Transitional Kindergarten</b>	<b>Big Ideas: Kindergarten</b>	<b>Big Ideas: Grade One</b>	<b>Big Ideas: Grade Two</b>
Reasoning with Data	Measure and Order	Sort and Describe Data	Make sense of Data	Represent Data
Reasoning with Data	Look for Patterns	n/a	Measuring with Objects	Measure and Compare Objects
Exploring Changing Quantities	Measure and Order	How Many?	Measuring with Objects	Dollars and cents
Exploring Changing Quantities	Count to 10	Bigger or Equal	Clocks and Time	Problem solving with measures

# Teaching & Learning Environments

Play-based learning materials foster exploration, investigation and experimentation.



# THE 5x8 CARD



Student Vital Actions	Principles
<p><b>All students participate</b> (e.g., boys and girls, ELL and special needs students), not just the hand-raisers.</p>	<p>Equity requires participation. <b>A &gt;</b></p>
<p>Students <b>say a second sentence</b> (spontaneously or prompted by the teacher or another student) to extend and explain their thinking. CCSS-M practices 1   2   3   6</p>	<p>Logic connects sentences. <b>B &gt;</b></p>
<p>Students <b>talk about each other's thinking</b> (not just their own). CCSS-M practices 1   2   3   6   7   8</p>	<p>Understanding each other's reasoning develops reasoning proficiency. <b>C &gt;</b></p>
<p>Students <b>revise their thinking</b>, and their written work includes revised explanations and justifications. CCSS-M practices 1   2   3   4</p>	<p>Revising explanations solidifies understanding. <b>D &gt;</b></p>
<p>Students look for more precise ways of expressing their thinking, encouraging each other to look for and use <b>academic language</b>. CCSS-M practices 3   6</p>	<p>Academic language promotes precise thinking. <b>E &gt;</b></p>
<p><b>English learners produce language</b> that communicates ideas and reasoning, even when that language is imperfect. CCSS-M practices 1   2   3   6</p>	<p>ELLs develop language through explanation. <b>F &gt;</b></p>
<p>Students <b>engage and persevere</b> at points of difficulty, challenge, or error. CCSS-M practice 1</p>	<p>Productive struggle produces growth. <b>G &gt;</b></p>



# Multiple Measures of Student Growth

- Observation Data
- DRDP for preschool and school age
- Formative assessment through games
- Data from Families / Home visits

***Data must be both Qualitative & Quantitative***

# Observation: Teacher as Object Recorder



## COG 3: Number Sense of Quantity

Child shows developing understanding of number and quantity

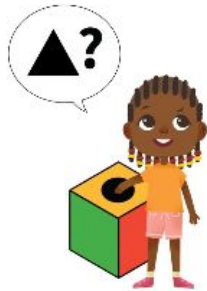
Mark the latest developmental level the child has mastered:

Responding Earlier	Responding Later	Exploring Earlier	Exploring Later	Building Earlier	Building Middle	Building Later	Integrating Earlier
<p>Responds to people or objects in basic ways</p>	<p>Responds to changes in the number of objects observed or interacted with</p>	<p>Demonstrates awareness of quantity</p>	<p>Uses number names, but not always correctly, in situations related to number or quantity</p>	<p>Identifies small quantities without counting, up to three</p>	<p>Counts up to five objects using one-to-one correspondence; <i>and</i> Recites numbers in order, one through ten</p>	<p>Shows understanding that the last number counted is the total number of objects in the group</p>	<p>Solves simple everyday problems involving numbers by counting up to 10 objects using one-to-one correspondence; <i>and</i> Recites numbers correctly, up to 20</p>
<p><b>Possible Examples</b></p> <ul style="list-style-type: none"> <li>Looks at objects that are hanging from a mobile.</li> <li>Calms in response to a familiar adult's touch.</li> <li>Turns toward a familiar adult's voice.</li> </ul>	<p><b>Possible Examples</b></p> <ul style="list-style-type: none"> <li>Attends to one moving toy on a mobile, then to another.</li> <li>Grasps one toy, and then lets go of it while reaching for another toy that has been introduced by a familiar adult.</li> <li>Holds an object in each hand, and then touches the two objects together.</li> </ul>	<p><b>Possible Examples</b></p> <ul style="list-style-type: none"> <li>Communicates, "More," during lunch.</li> <li>Dumps small cars out of a bucket.</li> <li>Gestures for more when playing with play dough.</li> <li>Shows excitement when an adult offers another book.</li> </ul>	<p><b>Possible Examples</b></p> <ul style="list-style-type: none"> <li>Communicates, "Dos," ["Two," in Spanish] and holds up two cups in the play kitchen.</li> <li>Communicates, "One, two, five, one, two," while pointing randomly to objects in a group.</li> <li>Signs, "Two," in response to the question of "How old are you?"</li> </ul>	<p><b>Possible Examples</b></p> <ul style="list-style-type: none"> <li>Communicates a desire for two apple slices after noticing that a peer has two apple slices.</li> <li>Communicates, "Three dogs," while looking at a picture of three dogs.</li> <li>Communicates, "Now I have one bear and you have one," while giving a peer a stuffed bear.</li> </ul>	<p><b>Possible Examples</b></p> <ul style="list-style-type: none"> <li>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.</li> <li>Chants numbers from one to 10 in order while waiting for a tricycle.</li> <li>Counts, "One, two, three," out loud while pointing to each of three squares on a light box.</li> </ul>	<p><b>Possible Examples</b></p> <ul style="list-style-type: none"> <li>Counts ducks in a storybook, "One, two, three, four, five," and then communicates that there are five.</li> <li>Communicates that there are six rocks after counting a collection of six rocks.</li> <li>Counts four pencils and says, "Apat," ["Four," in Tagalog] when asked how many pencils there are.</li> </ul>	<p><b>Possible Examples</b></p> <ul style="list-style-type: none"> <li>Counts six chairs, then counts seven children, and communicates, "We need one more chair."</li> <li>Counts accurately to 20 while marching.</li> <li>Counts on fingers to determine how many napkins to get so that each child at a table of six has one.</li> </ul>



# Games as Assessment Tools

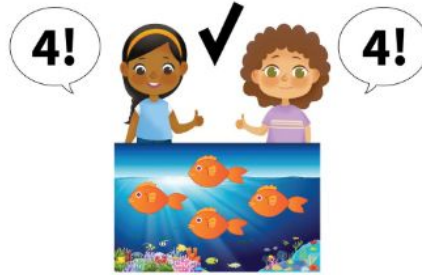
DREME For Teachers



Shapes

## What Shape Am I Touching?

Identify and describe shapes that are hidden in a box only by touching them.



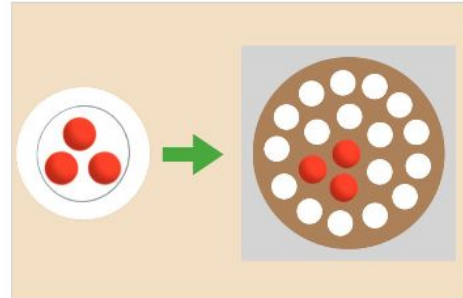
Number, Counting & Cardinality

Addition & Subtraction

## Big Fish Story

Count, add, and subtract to see how many fish are in the ocean as they jump back and forth from a pond. Watch out for the shark!

[Go to activity](#)



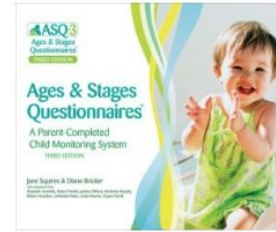
Number, Counting & Cardinality

Addition & Subtraction

## Cookie Game

Roll a number cube to know how many "chocolate chips" to put on one or more "cookies" until the cookies are filled.

# Data from Families



Families are:

1. **Experts**
2. **Team Members**
3. **Learners**
4. **Advocates**

Family  
Assessments



# Family Partnerships

## NUMBER SENSE

48 MONTHS (4 YEARS) TO 60 MONTHS (5 YEARS)

*How are children learning about numbers?*



Play the video to see examples of how children are learning about numbers for ages 48 months (4 years) to 60 months (5 years) followed by a group discussion by parents.



Play this audio file to hear a narration of the examples of child behavior from this video.



Download a PDF version of this print resource.

### Number Sense

#### Introduction

*What are preschool children learning about numbers?*

#### OVERVIEW

Young children explore and begin to practice the skills needed for mathematics long before they enter elementary school. During the first years of life, children learn

# Case Study: CSPP Parents Math Engagement

3-5 AÑOS

count · play · explore  
DISCOVER THE POWER OF MATH



Serie | Amplio Mundo De Las Matemáticas



¿Que está Cocinando?




Tiempo de Lavar



Siéntate y Cuenta

Latina Mothers' Cultural Experiences, Beliefs, and Attitudes May Influence Children's Math Learning by Susan Beltran-Grimm




# EARLY LEARNING

## MATH *at* HOME

- WELCOME YOUR CHILDREN TO MATH
- GIVING YOUR CHILD A GOOD START IN MATH
- FINDING MATHEMATICS EVERYWHERE
- THE EARLIEST MATHEMATICS LEARNING
- THE ROLE OF PLAY IN LEARNING MATH
- MATH GAMES TO PLAY WITH YOUNG CHILDREN
- COUNTING AND YOUNG CHILDREN
- MATH, READING, AND LANGUAGE TOGETHER
- ENJOYING ENGLISH-LANGUAGE LEARNERS
- GETTING READY FOR KINDERGARTEN
- MATH RESOURCES FOR PARENTS

### HELPING YOUR CHILDREN —BIRTH TO AGE FIVE— LEARN AND ENJOY MATHEMATICS



*A public-private collaboration of the  
California Mathematics Council, a  
non-profit, non-partisan organization for  
public and private mathematics education.*



# APRENDIZAJE TEMPRANO

PARA LOS NIÑOS DE 0 A 5 AÑOS

## Matemáticas *en* Casa

- BIENVENIDOS A LOS NIÑOS DE LAS MATEMÁTICAS
- DANDO A SUS NIÑOS UN BUEN COMIENZO EN LAS MATEMÁTICAS
- ENCONTRANDO LAS MATEMÁTICAS EN TODAS PARTES
- EL COMIENZO TEMPRANO DE LAS MATEMÁTICAS: DESDE EL COMIENZO HASTA LOS CINCO AÑOS
- EL PAPEL DEL JUEGO EN EL APRENDIZAJE DE LAS MATEMÁTICAS
- JUEGOS DE MATEMÁTICAS PARA NIÑOS EN SU CASA
- ENSEÑANDO A LOS NIÑOS PODEROSOS CON CÁLCULO
- LAS MATEMÁTICAS, EL LENGUAJE Y EL LENGUAJE COMÚN
- PARTICIPANDO EN LAS MATEMÁTICAS CON NIÑOS BILINGÜES
- COMIENZANDO PARA EL KINDERGARTEN
- RECURSOS PARA NIÑOS Y PADRES PARA NIÑOS EN SU CASA

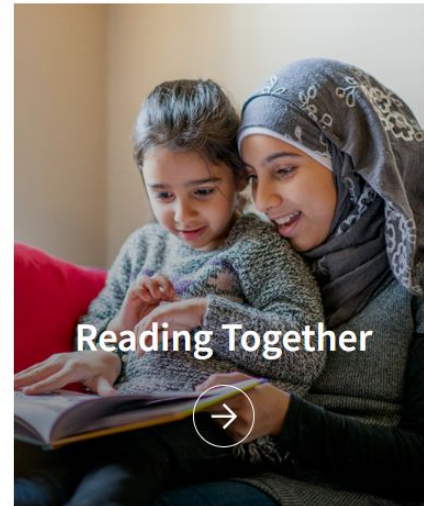
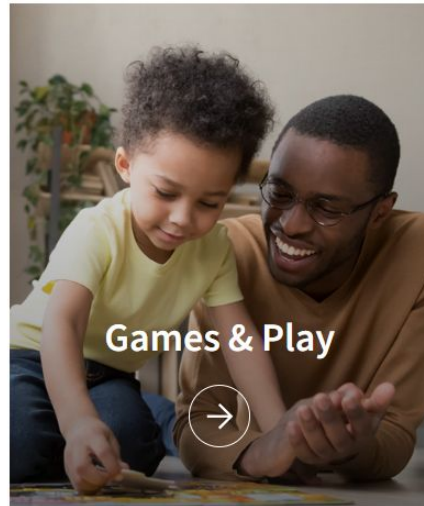
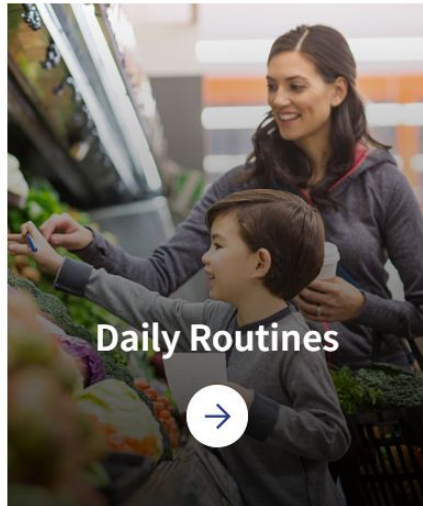
### AYUDANDO A SUS NIÑOS A APRENDER Y DISFRUTAR LAS MATEMÁTICAS



*Una colaboración de recursos educativos del  
California Mathematics Council, una  
organización no partidista y no partidista  
comprometida con la educación de matemáticas  
del público y privado.*



materials required. [Many activities also available in Spanish.](#)



# 6 Competencies of P-3 Learning Communities

1. Embrace the Pre-K - 3 Learning Continuum
- 2. Ensure Developmentally Appropriate Teaching**
3. Provide Personalized, Blended **Learning Environments**
- 4. Use Multiple Measures to Guide Student Learning & Growth**
5. Build Professional Capacity across the Learning Community
- 6. Make Schools the Hub of Pre-K - 3 Learning for Families and Communities**

# Santa Clara County Office of Education

The **Santa Clara County Office of Education (SCCOE)** is a premier service organization driven by the core principles of equity, diversity, inclusion, and partnership. The SCCOE is committed to serving, inspiring, and promoting student and public school success.

Working collaboratively with school and community partners, the SCCOE is a regional service agency that provides instructional, business, and technology services to the 31 school districts of Santa Clara County. The County Office of Education directly serves students through special education programs, alternative schools, Head Start and State Preschool programs, migrant education, and Opportunity Youth Academy. The SCCOE provides academic and fiscal oversight and monitoring to districts in addition to the Santa Clara County Board of Education authorized charter schools.

# Leadership, Service, & Advocacy

## County Superintendent of Schools



Dr. Mary Ann Dewan

## County Board of Education



Maimona Afzal Berta  
Area 6



Victoria Chon  
Area 5



Joseph Di Salvo  
Area 4



Raeena Lari  
Area 7



Grace Mah  
Area 1



Don Rocha  
Area 3



Tara Sreekrishnan  
Area 2

# Connect with SCCOE

- Social Media



- IMPACT Weekly (e-newsletter)
- www.sccoe.org