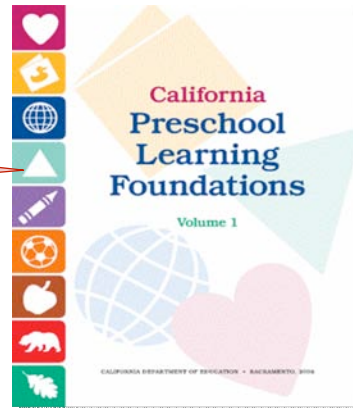


Mathematics Domain  
California Preschool Learning Foundations  
Volume 1

Mathematics



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## California Preschool Learning Foundations

1. Describe typical development, under conditions appropriate for healthy development, rather than aspirational expectations for children's behavior.
2. Assume learning for *all* children occurs in everyday environments through social interactions, relationships, activities, and play.
3. Are guidelines and teaching tools, *not* a list of items to be taught or used for assessment.



## California Preschool Learning Foundations

- Are intended to be representative of and accessible to *all* learners, including children with disabilities and those learning English as a second language.
- Incorporate universal design for learning by encouraging *multiple and various* means of:
  - Representation
  - Engagement
  - Expression



## Preschool Learning Foundations in Mathematics

- Identify behaviors in mathematics learning that are typical of children who will be ready to learn what is expected of them in kindergarten.
- Provide age-appropriate competencies expected or goals for *older* 3 year olds and *older* 4 year olds.
- Are intended to be guidelines and tools for instructional practice, not limits on the way teachers support children's learning at different levels.

# School Readiness

- Focusing on the child's readiness for school in mathematics learning acknowledges that there must be appropriate social-emotional, cognitive, and language development, as well as appropriate motivation (p. 143, PLF, V1).



## Map of the Foundations Mathematics

		Domain	
		Algebra and Functions (Classification and Patterning)*	
Strand			
Age		At around 48 months of age	At around 60 months of age
Substrand		1.0 Children begin to sort and classify objects in their everyday environment.	1.0 Children expand their understanding of sorting and classifying objects in their everyday environment.
Examples		<p><b>1.1</b> Sort and classify objects by one attribute into two or more groups, with increasing accuracy.</p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• Selects some red cars for himself and some green cars for his friend, leaving the rest of the cars unsorted.</li> <li>• Chooses the blue plates from a variety of plates to set the table in the kitchen play area.</li> <li>• Sorts through laundry in the basket and takes out all the socks.</li> <li>• Places all the square tiles in one bucket and all the round tiles in another bucket.</li> <li>• Attempts to arrange blocks by size and communicates, "I put all the big blocks here and all the small ones there."</li> </ul>	<p><b>1.1</b> Sort and classify objects by one or more attributes, into two or more groups, with increasing accuracy (e.g., may sort first by one attribute and then by another attribute).<sup>†</sup></p> <p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• Sorts the large blue beads into one container and the small red beads in another.</li> <li>• Puts black beans, red kidney beans, and pinto beans into separate bowls during a cooking activity.</li> <li>• Arranges blocks on the shelf according to shape.</li> <li>• Sorts a variety of animal photographs into two groups: those that fly and those that swim.</li> <li>• Sorts buttons first by size and then each subgroup by color into muffin tin cups.</li> </ul>

\* Throughout these mathematics foundations many examples describe the child manipulating objects. Children with motor impairments may need assistance from an adult or peer to manipulate objects in order to do things such as count, sort, compare, order, measure, create patterns, or solve problems. A child might also use adaptive materials (e.g., large manipulatives that are easy to grasp). Alternatively, a child might demonstrate knowledge in these areas without directly manipulating objects. For example, a child might direct a peer or teacher to place several objects in order from smallest to largest. Children with visual impairments might be offered materials for counting, sorting, or problem solving that are easily distinguishable by touch. Their engagement is also facilitated by using containers, trays, and so forth that contain their materials and clearly define their work space.

† Attributes include, but are not limited to, size, shape, or color.

Includes notes for children with disabilities

## Foundations in Mathematics: Five Developmental Strands



- Number Sense
- Algebra and Functions
- Measurement
- Geometry
- Mathematical Reasoning

## Number Sense



- Important aspects of counting, number relationships, and operations (p. 145, PLF, V1).

## Number Sense

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
1.0 Children begin to understand numbers and quantities in their everyday environment.	1.0 Children expand their understanding of numbers and quantities in their everyday environment.
2.0 Children begin to understand number relationships and operations in their everyday environment.	2.0 Children expand their understanding of number relationships and operations in their everyday environment.

## Number Sense

- *Counting* is foundational for future understanding of mathematics.
- Building blocks for counting, include understanding:
  1. The sequence of number words.
  2. One-to-one correspondence.
  3. Cardinality.



## Number Sense

- *One-to-one correspondence*
  - Understanding that one and only one number word is used for each object in the array of objects being counted.
- *Cardinality*
  - Knowing that the last number assigned to the last object counted gives the total number in the set.



## Number Sense

- *Subitize*
  - The ability to quickly and accurately determine the quantity of objects in a small group (of up to five objects) without actually counting the objects.

## Algebra and Functions (Classification and Patterning)

- Sorting and classifying objects; recognizing, extending, and creating patterns (p. 145, PLF, V1).



## Algebra and Functions (Classification and Patterning)



## Algebra and Functions

<i>At around 48 months of age</i>	<i>At around 60 months of age</i>
1.0.Children begin to sort and classify objects in their everyday environment.	1.0 Children expand their understanding of sorting and classifying objects in their everyday environment.
2.0 Children begin to recognize simple, repeating patterns.	2.0 Children expand their understanding of simple repeating patterns.

## Algebra and Functions

- *Classification*
  - The sorting, grouping, or categorizing of objects according to an established criteria.
- *Attribute*
  - A property or characteristic of objects that can be used as a basis for grouping or sorting.

## Measurement

- Comparing and ordering objects by length, weight, or capacity; precursors of measurement (p. 146, PLF, V1).



## Measurement

### *At around 48 months of age*

1.0 Children begin to compare and order objects.

### *At around 60 months of age*

1.0 Children expand their understanding of comparing, ordering, and measuring objects.



## Geometry

- Properties of objects (shape, size, position) and the relation of objects in space (p. 146, PLF, V1).



## Geometry

### ***At around 48 months of age***

1.0 Children begin to identify and use common shapes in their everyday environment.

2.0 Children begin to understand positions in space.

### ***At around 60 months of age***

1.0 Children identify and use a variety of shapes in their everyday environment.

2.0 Children expand their understanding of positions in space.

## Geometry

- *Shape knowledge*
  - The recognition, naming and understanding of shape characteristics and properties (Clements 2004a).
- *Space*
  - The recognition, naming and understanding of location, direction, distance and identification of objects (Clements, 1999).

## Mathematical Reasoning

- Using mathematical thinking to solve problems in play and everyday activities (p. 147, PLF, V1).



# Mathematical Reasoning

## *At around 48 months of age*

1.0 Children use mathematical thinking to solve problems that arise in their everyday environment.



## *At around 60 months of age*

1.0 Children expand the use of mathematical thinking to solve problems that arise in their everyday environment.

