



OVERVIEW OF EARLY MATHEMATICAL DEVELOPMENT: CONCEPTS, LANGUAGE, AND SKILLS

Even in their first year, babies are already building important math concepts. While exploring objects, babies begin to learn about number, shape, size, and spatial relations. When parents use math words (such as *one, two, round, big, in, on*), it helps babies develop language and math concepts. Parents can give young babies a good start on math concepts by using math words when they talk, sing, play, and read books with their baby.

12 TO 24 MONTHS

one, two, many

Explores number in play with objects (grouping objects; putting objects in one-to-one correspondence)
Understands and begins to use words that refer to quantity (*more, a lot, so many*)
Begins to use simple number words, usually without exact understanding
May begin to understand the meaning of *one* and *two*

2 TO 3 YEARS

more, less, first, last

Uses the word *two* to accurately label pairs of objects
Recites strings of counting numbers, such as *one-two-three* or *one-two-four-six*
Imitates counting objects by touching or pointing and saying number-words
Understands that *adding to* makes more and *taking away* makes less
Understands and uses ordinal terms *first, next, last*

3 TO 4 YEARS

$$\bullet + \bullet = \bullet \bullet$$

Quickly recognizes very small groups of one, two, or three objects without counting
Recites the counting series up to five or ten; counts about five objects accurately
Begins to solve simple adding and subtracting problems (plus or minus 1) with small numbers of objects
Compares two groups of objects that are very small (1-3) or very different in number
Begins to understand and use ordinal number words *second...fifth*

4 TO 5 YEARS

1, 2, 3, 4, 5, 6, ... 10!

Recognizes and names several written numerals; begins to understand that numerals represent specific quantities
Recites the counting series to 10 or 20 (with errors in the teens); counts about 10 objects accurately
Solves simple adding and subtracting problems (plus or minus 1 or 2) by counting or mental calculation
Uses counting and one-to-one correspondence to compare groups of objects; uses terms *more, less, and same*

NUMBER CONCEPTS AND SKILLS

KNOWLEDGE ABOUT SHAPES AND SPATIAL RELATIONS



Manipulates objects and explores shape (round, flat sides, pointed) and functional characteristics (*Does it roll? Can I stack it? Does it fit inside?*)
Explores shape, size, and spatial relations in play with objects (puts objects on, in, or next to other objects; puts objects in/takes objects out)



Compares and matches shapes during play (stacks blocks; works simple inset puzzles)
Understands and uses words that describe simple spatial relations and concepts (*in, on, off, up, down*)
Begins to understand and use words that describe shape (*round, pointy, flat, long*)



Begins to recognize, name, and compare some common geometric shapes (squares, circles, triangles, rectangles)
Begins to understand and use words that describe complex spatial relations (*between, across, in front of, behind*)
Creates shapes in constructions, drawings, and puzzles



Begins to identify, describe, and compare common geometric shapes based on their attributes (number of sides, number of corners/angles)
Explores shape and space by creating elaborate constructions with blocks, Legos, boxes, etc.

12 TO 24 MONTHS

2 TO 3 YEARS

3 TO 4 YEARS

4 TO 5 YEARS

MEASUREMENT AND COMPARISON

hot cold fast slow

Explores dimensions of objects such as size, weight, and capacity in their play

Begins to understand descriptive words such as *big, little, hot, fast*

more/less first/last

Continues to explore and learn about dimensions, such as size, weight, capacity, and speed

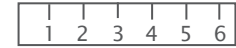
Uses information about length and distance to solve problems (gets chair to reach toy on shelf)

Uses words such as *big* and *little* to label and compare objects



Compares height, weight, size, etc., of objects or people, usually just by looking or guessing

Increasingly, uses comparison words (*taller, faster, heavier, smaller, tallest, fastest, heaviest, smallest*)



Compares using strategies such as lining up two objects to see which is longer or picking up two objects, one in each hand, to learn which is heavier

Begins to learn about measuring with units using measurement tools (rulers, scales, cups)

PATTERNS

e-i-e-i-o

Responds to patterns in daily routines; anticipates what will happen next

Repeats action sequences over and over again in their play (*put it in, dump it out*)

Attends to patterns of sounds, words, and actions in stories, songs, and games



Follows the pattern of steps in familiar routines such as meal time, bedtime, leaving for daycare

Follows and begins to copy simple patterns, repeating sounds, words, and actions in stories, songs, and games

Duck, Duck, Goose!

Remembers and follows patterns in their daily routines and play

Increasingly, remembers and repeats simple patterns of sounds, words, and actions in stories, songs, and games



Begins to recognize, copy, create, and describe patterns in art they create, stories they hear, songs they sing, and their play with objects, etc.

ANTICIPATORY GUIDANCE

What parents can do throughout the day with their child while at home, reading together, shopping for food, or even sitting on the bus!

Sing songs, read books, and play games involving numbers

Use simple shape and spatial words (*in, on, under, up, down*)

Emphasize words that describe size and other characteristics (*big/little, fast/slow, high/low*)

Read books with simple repeating text, such as *Goodnight Moon* by Margaret Wise Brown

Sing songs and play games with repeating words or actions, such as *The Wheels on the Bus* and *peek-a-boo*

Use number words and words that compare (*more, less, same number*)

Model counting objects by touching each object as you say the number

Talk about size, speed, weight, etc.; compare things (*bigger/smaller, faster/slower, lighter/heavier*)

Read books, play games, and sing songs that have repeating patterns; encourage your child to join in

Count things with your child (steps to the mailbox, objects, animals, people); ask *How many...?*

Compare quantities (*more/less, same number*); talk about differences (*1 more, 1 less*)

Talk about shapes in everyday life or pictured in books (*circle, square, triangle*)

Point out positions of objects, direction, and order

Use ordinal number words (*first, second, third, etc.*)

Pose number questions or simple problems (*Grandma's coming to dinner. How many plates should we put on the table?*)

Encourage children to count to solve number problems

Help children notice, compare, and talk about shapes and their features (sides, curves, angles)

Help children describe patterns they see or patterns they create

Play board, card, and dice games that involve counting, matching, or comparing