



COOPERATIVE EXTENSION

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Fact Sheet 01-03



Making the Most of Math Math in the Early Childhood Program

Children who have a zest for math-related concepts at an early age often do better in school. They learn how to sort and classify; to find similarities and differences; and to measure and solve problems. These are all skills that are critical when young children get to elementary school.

Opportunities to gain math skills are everywhere. Children practice math skills when they:

- sort their crayons by color
- put puzzles together
- play “house”
- build with blocks
- match their socks
- sing “Five Little Monkeys Jumping On The Bed”
- count their raisins during snack and compare how many they have with how many their neighbors have.

Preschool and Kindergarten Math Skills

There is more to math than learning to count to 10. Children begin to acquire a variety of ways of thinking about mathematics in their first 8 years. Below is a brief listing of some of these basic math skills. Some of these skills may not even seem like math, and their names may seem strange, but they provide the foundation for understanding math.

One-to-one Correspondence and Counting

Early childhood teachers often emphasize counting. Counting involves memorizing the number words in the proper order (one, two, three, four, five...). Being able to use this knowledge to skillfully count an actual number of objects is understanding *one-to-one correspondence*. The child who understands one-to-one correspondence will count the cups correctly – saying, “one” for the first cup, “two” for the second, and “three” for the third.



“One”



“Two”



“Three”

Many young children memorize the number words in the proper order, but may not yet understand the concept of one-to-one correspondence. For example, they might say “1,2,3,4,5” but skip counting a cup. Or, they might count a cup twice and end up with four instead of three cups. Children need many opportunities to practice saying one number in association with one object. Also, during the preschool years, children begin to recognize and write numerals.

Sequencing and seriation

Sequencing is the ability to create and identify patterns. For example, children may stack blocks in a pattern of white, black, white, black, and so on.



One way we use sequencing skills as adults is when we are looking for an address. We look at the house numbers and look for the pattern which helps us predict which direction to go to find the house.

Seriation is arranging objects in order by size, location or position. Have you ever asked children to arrange objects from smallest to largest, largest to smallest, shortest to tallest or thinnest to thickest? You’ve been teaching seriation.



Subtraction and Addition

With preschool children, addition and subtraction is really the concept of “more than” and “less than.” If you have ever given children crackers, you definitely know they understand these concepts when Jimmy says that Danny has more crackers than he does! Taking away crackers from Danny and giving them to Jimmy may not be popular with Danny, but if he understands *more than*, *less than* and *equal or the same as*, this solution will be accepted as fair.



Memorization of math “facts” such as: $1 + 1 = 2$ or $4 - 1 = 3$, is not appropriate for young children. It doesn’t have any real meaning for them. It is the understanding and knowledge of “adding” or “taking away” that is important.

Spatial Relationships

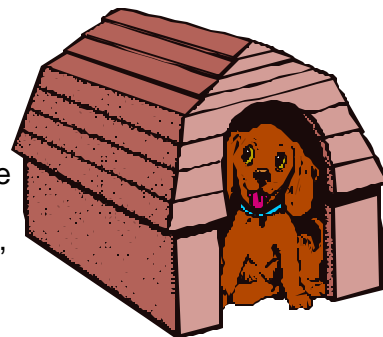
Spatial relationships explore the concept of where objects are in relationship to something else. Vocabulary associated with this concept is:

above, below
in front of, in back of

before, after
inside, outside

high, low
on top of, under

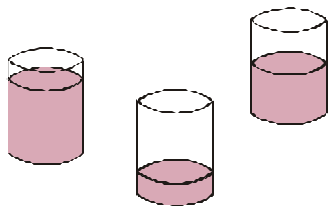
Learning to understand spatial relationships helps children talk about where things are located. For example, a ball may be *behind* the chair or *under* the table, or *in* the box. The dog may be *on* the blanket, *outside* the house, or *in* the doghouse.



Matching, classifying and measuring

Children's ability to match, compare, and sort further develops their knowledge of relationships among things.

- ✓ **Matching** involves finding things that are the same, or alike. Children can match blocks, leaves, or plates. Once they can match, they can begin to compare.
- ✓ **Comparison** is the skill used to identify similarities and differences among objects. For example, is my block the same or different than your block? Comparison leads to classification.
- ✓ **Classification** is the concept of organizing objects in groups by specified traits. Children can learn to match and sort objects, people, events and pictures into groups according to color, shape and size. Being able to sort generates sets of items.
- ✓ **Sets** are simply a collection of things. In your child care program you could find many sets, such as blocks, markers, food, people and animals.



- ✓ Finally, children can learn to **measure**. Measuring is determining the extent or degree of something. For example, they can measure a block in many ways: height, weight, length, even temperature.

The Development of Math Skills

Children gradually acquire these skills over the course of their development. Scholastic Teacher Services provides the following timeline for when these skills typically develop in young children.

Newborn to Two Year Olds

- ✓ use all of their senses to identify familiar objects and people
- ✓ begin to predict and anticipate sequences of events
- ✓ notice cause-and-effect relationships
- ✓ begin to classify objects in a simple but thoughtful manner – for example, toys that roll, toys that don't
- ✓ use language to classify objects according to basic characteristics, such as type (toy animals, blocks).



Two to Three Year Olds

- ✓ begin to understand the concept and use of numbers – they realize, for example, that when they count their crackers, each is given one number
- ✓ count three or four objects, but then may count the same object twice or skip objects
- ✓ begin to use relationship words and comparative language, such as bigger and under
- ✓ understand many directional and relationship words, such as straight and behind
- ✓ able to fit large puzzle pieces into place, demonstrating an understanding of the relationships between geometric shapes
- ✓ notice patterns in the things they see and hear
- ✓ able to make cause-and-effect predictions.



Three to Four Year Olds

- ✓ recognize and look for geometric shapes in the environment (“my cracker is square”)
- ✓ enjoy sorting and classifying objects, usually by only one characteristic at a time – color, shape, or size
- ✓ begin to classify things by their uses
- ✓ notice and compare similarities and differences
- ✓ use words to describe size and quantity relationships – “My bowl is the biggest!”

Four to Five Year Olds

- ✓ enjoy playing games involving numbers
- ✓ struggle with classifications that are not obvious
- ✓ count objects or people up to 10 or 20 with less skip-counting or double counting
- ✓ understand that symbols represent complex patterns
- ✓ solve multiple-piece puzzles by recognizing and matching geometric shapes
- ✓ use concepts such as height, size, and length to compare objects.



Five to Six Year Olds

- ✓ begin to be able to add small numbers in their heads but still are more comfortable adding real objects they can actually touch and move
- ✓ classify objects according to more than one characteristics – sorting the round and blue blocks and the red square ones
- ✓ have longer attention spans for activities that interest them
- ✓ use positional words to explain spatial relationships (e.g. on top of the table, behind the chair).

Make the Most of Math

Providing opportunities for children to explore and practice their beginning math skills helps set a strong foundation for the more advanced math skills they will encounter in school. They learn these skills through hands-on activities and play throughout their daily experiences.

Seeing the variety of basic math skills helps us understand that opportunities to learn about math are found throughout our daily curriculum. Math skills are learned in the:

- ✓ games we play at circle time (e.g. Duck, Duck, Goose teaches following a sequence),
- ✓ activities we provide for dramatic play (e.g. playing “store”),
- ✓ books we read with children (e.g. “Inch By Inch”),
- ✓ toys we have for children to play with (e.g. making patterns with construction toys),
- ✓ songs we sing with children (e.g. “One, Two, Buckle My Shoe”),
- ✓ activities we offer for self awareness (e.g. “I Have Two Eyes”).

Make the most of opportunities to build math skills. Through play children can learn that math is exciting. Children who have a chance to engage in a variety of activities build their own understanding of mathematical ideas – and get a head start toward elementary school.

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