

Brain Growth and Development

A peek at the early stages of brain development and how early childhood education encourages brain growth, memory and language development in babies and young preschool children.

At birth, a baby's brain already has 100,000,000,000 cells. This is about the same number of stars in the Milky Way. Unlike the rest of a new baby's body, the brain is not complete at birth. In order to start working, the cells need to communicate with each other. As a baby starts to experience life, connections are made between cells - the more connections there are, the more the brain can do.

A baby's brain develops so fast that by age two a child who is developing normally has the same number of connection as an adult. By age three, a child has TWICE as many brain connections as an adult.

Early milestones in brain growth.

4 months: The infant's brain responds to every sound produced in all the languages of the world.

8 to 9 months: Babies can form specific memories from their experiences, such as how to push a ball to make it roll.

10 months: Babies can now distinguish and even produce the sounds of their own language (such as "da-da") and no longer pay attention to the sounds of language that are foreign.

12 months: Babies whose parents say, for example, "Lookeee at the doggiee," will go to the appropriate picture of a dog in a picture book more often than those babies who are talked to in normal, flatter voices.

12 to 18 months: Babies can keep in memory something that has been hidden and find it again, even if it has been completely covered up. They can also hold memory sequences of simple activities, such as winding up a Jack-in-the-box until the figure pops up.

24 months: Preschool children now have clear pictures in mind of people who are dear to them, and they get upset when separated from these people (even their peers).

30 months: Preschool children can hold in mind a whole sequence of spatial maps and know where things are in their environment.

36 months: A preschool child can now hold two different emotions in his mind at the same time, such as being sad that he spilled ice cream on his clothes but glad that he's at a birthday party.

How Preschool Education Helps Brain Development**

Morning Greeting

Whenever an adult speaks directly and personally to a preschool child, cascades of impulses go through the child's neurons (nerve cells), which are connected to one another by synapses. The repetition of these kinds of positive early interactions actually helps the brain reinforce the existing connections and make new ones.

Fingerplay

By a couple of months of age, babies can process the emotional contours of language (prosody), which means they tune in to the emotional variations in your voice. (In fact, toddlers can memorize nursery rhymes because rhymes have prosody!) As the preschool teacher raises her voice an octave and draws out her vowels, the child's brain responds by sending even more chemical and electrical impulses across the synapses.

Story time

Early childhood teachers are careful to have small groups for story time so that preschool children are able to get involved and process information. Young children need real interactions in order to learn. As she reads, the teacher will use melodic voice tones to ensure children's involvement and learning.

Free play / Work time

During free play, preschool children interact with one another. As they communicate, whether through beginning language or more sophisticated use of words, the neurons in their brains are making more connections, critical for reinforcing learning.

Snack

Further opportunities for communication lead to the repetition of impulses sent through the brain. The more repetition that goes on, the more the brain grows sure in its understanding. Repetition of language sounds is crucial to brain development.

Circle time

As the early childhood caregiver focuses her attention on each individual child in the large group activity, the child must think about the topic for the day. The child's brain will be active as he/she retrieves from memory something

special in her own personal history that she has learned. Each day children reap the benefits of preschool education.

**Brain development information from an article in *Scholastic Parent & Child*, by Alice Sterling Honig, Ph.D. April/May 1999