

Playing to Learn!

The Connection between the Body and the Brain



Playing is Learning!

Play is children's work, love, and life. Play engages the whole human being—physically, socially, emotionally and cognitively. Some people tend to view learning or education as a distinctly separate function from play. Learning is work, serious, and important; play is seen as unimportant, frivolous, and valuable only as recreation. However, it is in the ordinary daily play experiences that the child does the things he likes to do, is vitally interested in, has fun, and learns fastest. In playing and interacting with their world children are doing the things they need to do to get their brains ready for learning.

Did you know that children grow into their brains? It is the body that teaches the brain and not vice versa. Children learn from their brain stems up where they process sensory information, learning about their environment and how to move through it. The brain stem is about the size of your thumb and connects the spinal cord to the higher levels of the brain (mid-brain/limbic system and upper brain/cerebral cortex). In this brain stem sensory integration takes place. Sensory integration refers to the ability to organize sensory information for use—information coming from within as well as outside of the body. The outside information or external stimulus includes the five senses—smelling, tasting, seeing, hearing and the sense of touch being the primary stimulus. The internal stimulus is not as easy to understand but is obvious when we see children at play. Young children love to climb, use wheel toys and in general be in constant motion. When they move, it is the proprioceptive or kinesthetic system that is activated—sensations from the muscles, tendons and joints. Another internal system is also activated when children creep, crawl, roll, rock, jump, spin or swing. This system is called the vestibular system. This is a nerve-system centered in the brain stem and linked very closely with the cerebellum and the inner-ear mechanism, which also plays a vital part in developing balance and coordination. So, whenever movement of the head occurs it activates the vestibular system sending information to the vestibular nuclei in the brain stem...thus promoting brain stem growth. This is the level of the brain which needs stimulus at this young age. The body and the brain are not seen as separate entities but as totally integrated—one dependent on the other—neurologically connected. In other words, the central nervous system needs to be stimulated with movement to lead to cognitive and intellectual abilities.

Right brain, left brain, whole brain. The cerebrum of the brain consists of two distinct halves—the cerebral hemispheres, each with four lobes: occipital, parietal, temporal and frontal. Each of these two halves, known as the right and left hemispheres is in charge of different kinds of thoughts and actions. In general terms the left-hand side of your brain plays a major part in processing logic, words, mathematics and sequence—the so-called academic parts of learning. The right-hand side of the brain deals with rhythm, rhyme, music, pictures, emotion and intuition—the so-called global or creative activities. Both sides of the brain are joined by a fiber bridge known as the corpus callosum. This is a highly complex switching system containing 300 million active neurons. It acts as a superhighway allowing quick access to both the linear detail in the logic hemisphere and the overall image in the global hemisphere for integrated thought. Although our hemispheres each have their specialties, we must remember that they work in concert at all

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times. Some people describe themselves as being left-brained or right-brained. But the more we access both hemispheres, the more intelligently we are able to function. Actually, it is necessary to use both hemispheres of the brain to be maximally proficient at anything.



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Midline and cross lateral movement. The point at which the two lateral sides of the body meet and are able to work at that point is called the midline. You may have noticed a young child transfer a crayon from one hand to the other when crossing the center of the paper. This is telling us that the corpus callosum is immature. This inability to cross the body's midline is a sign that the hemispheres of the brain are still working independently. It is imperative that we give the motor strip, the corpus callosum, which links the right and left hemisphere time to mature before asking children to read, write, solve problems or remember complicated directions. We know that in order for children to read or write they have to be able to cross the midline—as the eyes travel across the page to read or the hand holding a pencil writes a sentence. What activate corpus callosum growth are play, movement, and physical activity. We can promote brain development by letting children do the things that come naturally as they grow and develop—creep, crawl, spin around and hang upside down. It is also known that the left side of the brain controls the right side of the body and the right side of the brain controls the left side of the body. When children do arm and leg movements that cross over from one side of the body to the other—cross-lateral movements—the two sides of the brain are forced to communicate and thus strengthen the nerve-cell pathways that link both sides of the brain through the corpus callosum. To encourage cross-lateral movement sing songs and repeat chants using hand motions that cross the midline of the body such as “Pat-a-Cake” and “Hot Cross Buns.” Dance using streamer ribbons or scarves and ask children to swish the scarves across the front of their bodies.

The brain is a work in progress. The brain is a very busy organ and I've described only a few of the key biological systems of how the human brain functions and learns. I'm excited to share with you activities involving nutrition, music, movement, relaxation and exercise to assist children in the development of their brain potential. The more we understand about brain development the more effective we will be as teachers. Come play and learn how the body teaches the brain!

How Physical Activity Builds Your Child's Mental Abilities

What your child does *physically* in the first few years of life plays a major part in how well she will develop all other abilities, including reading, writing, mathematics and creativity. Certain types of physical activity, such as crawling, walking and spinning actually help a child's brain to develop higher intelligence.

Many activities stimulate different parts of the brain, so that spinning, for instance, builds up both mechanisms in a child's ear – which can improve hearing and the brain's balance mechanism, which later helps a child to ride a bike, type, do gymnastics and handle a computer. Here is a very simplified model to suggest how it works:

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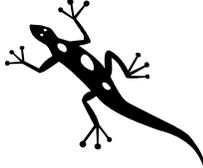
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<p>1. The reptilian brain</p>  <p>Brain Stem</p>	<p>The activity...</p> <p>Grasping Crawling Walking Reaching Turning Touching Arm-leg Movements Pushing Pulling</p>	<p>...leads to</p> <p>Hand-eye coordination Big motor skills Pre-writing ability</p>
<p>2. The balancing brain</p>  <p>Cerebellum</p>	<p>The activity...</p> <p>Spinning Balancing Listening Swinging Rolling Tumbling Dancing</p>	<p>...leads to</p> <p>Balance Sporting ability Bicycle riding Writing skills Fine motor coordination Reading Skills Typing, word processing</p>
<p>3. The emotional brain</p>  <p>Limbic System</p>	<p>The activity...</p> <p>Stroking Cuddling Playing together Socializing</p>	<p>...leads to</p> <p>Love Security Bonding Social skills Cooperation Confidence</p>
<p>4. The thinking brain</p>  <p>Cortex</p>	<p>The activity...</p> <p>Stacking toys Assembling puzzles Recognizing patterns Making patterns Playing word games Repetitive play Appreciating good music</p>	<p>...leads to</p> <p>Math, logic Problem solving Fluent reading, spelling Writing, painting Good vocabulary Memory Musical ability</p>

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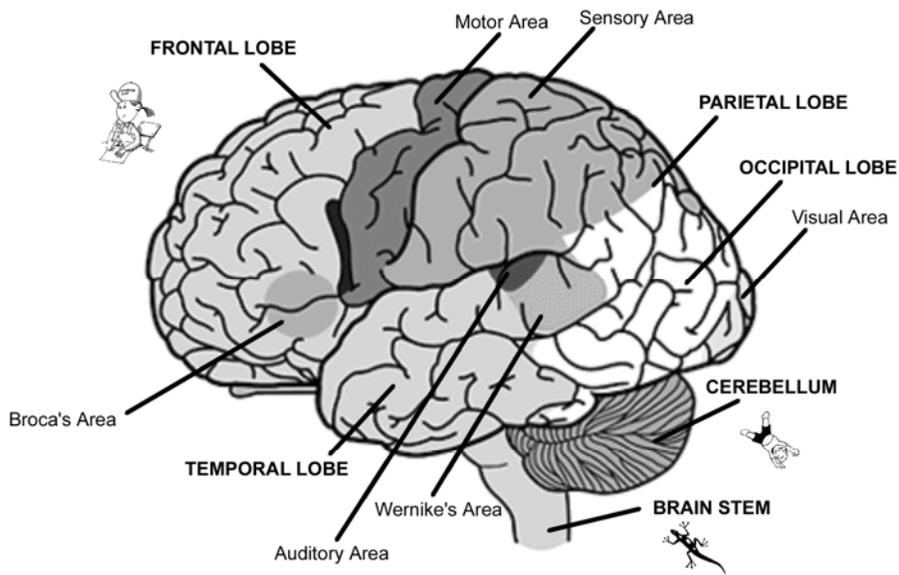
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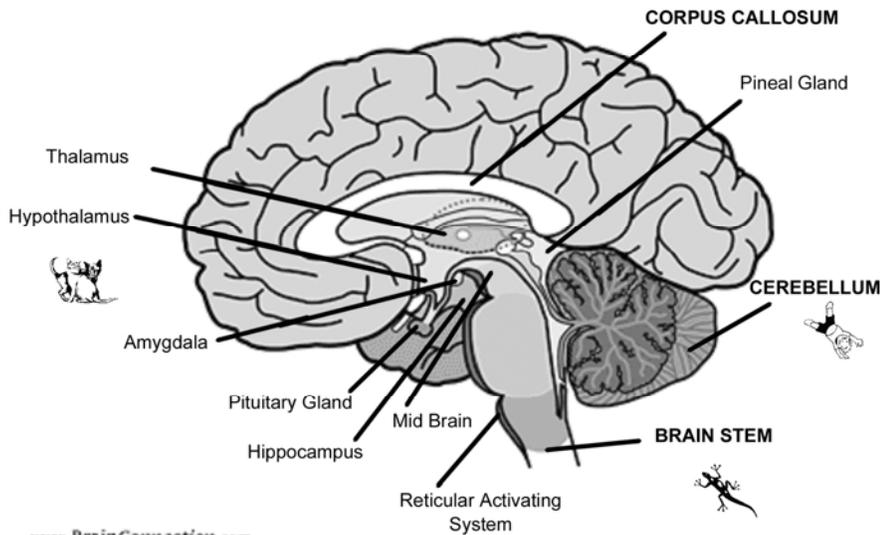
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Main Areas of the Brain



Emotional Brain: Limbic System



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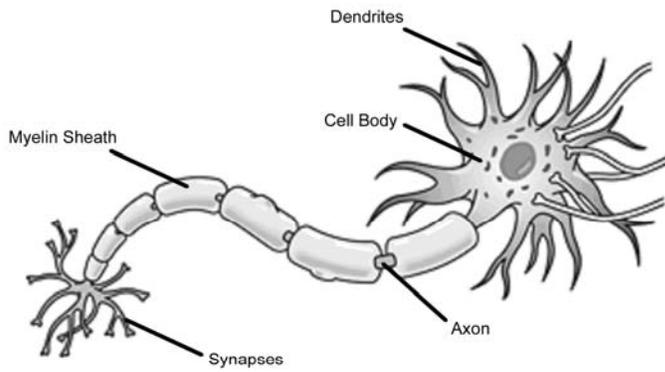
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Neuron

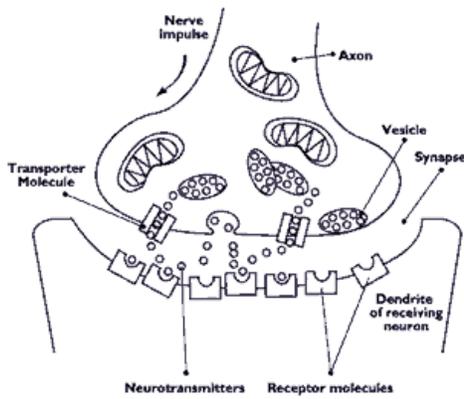


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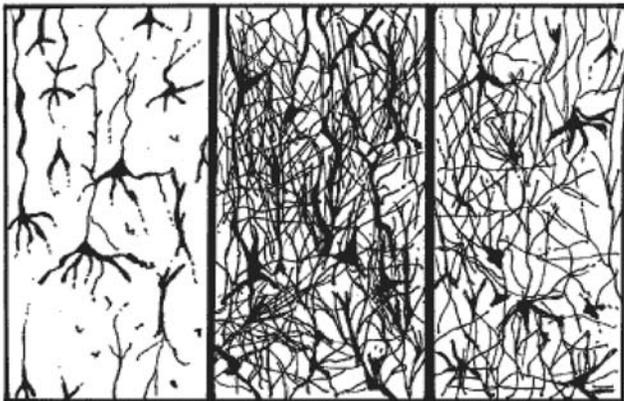
Synaptic Connections



At Birth

7 Years Old

15 Years Old



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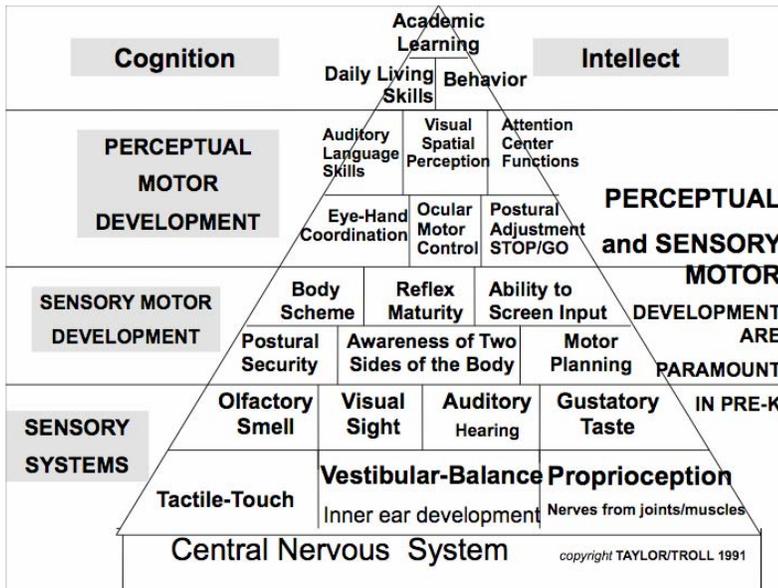


Synaptic Density Synapses are created with astonishing speed in the first three years of life. For the rest of the first decade, children's brains have twice as many synapses as adults' brains. Drawing supplied by H.T.Chugani.

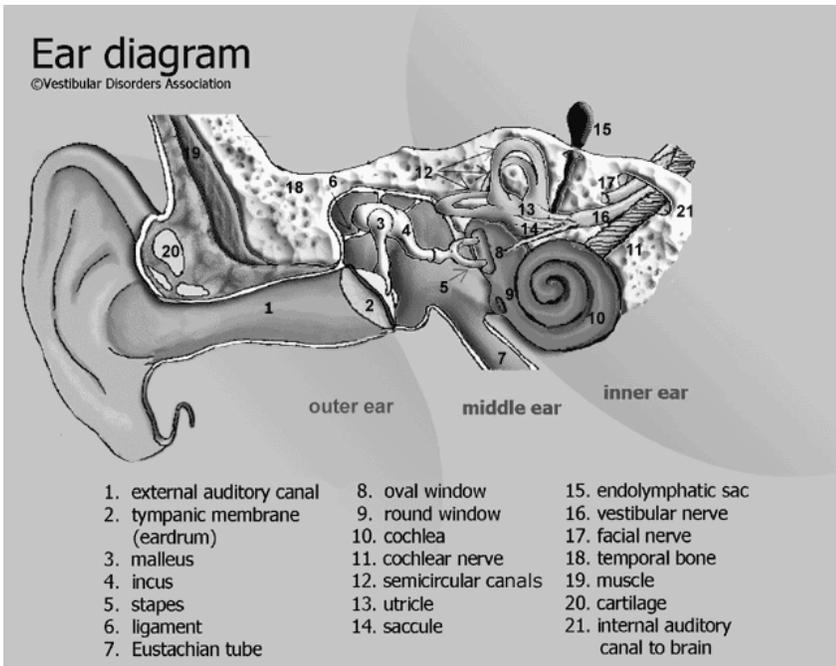


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Pyramid of the Central Nervous System



Vestibular System



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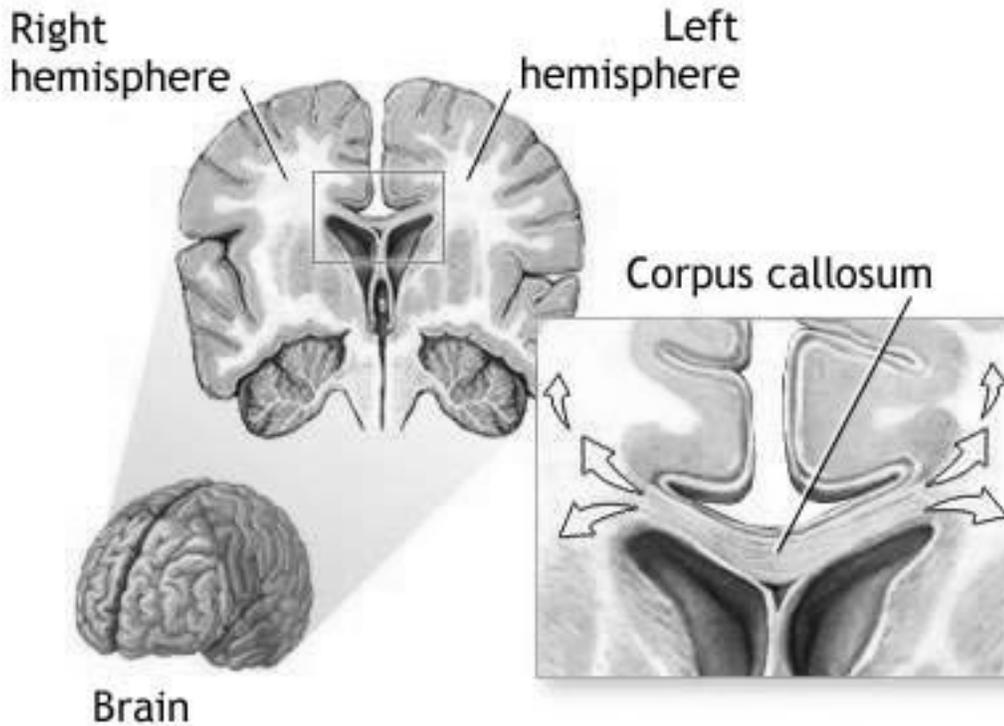
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* The image of the brain is shown as if looking at you.

Right Hemisphere Center for:

- Spatial Abilities
- Face Recognition
- Music
- Rhyme
- Rhythm
- Visual Imagery - pictures
- Imagination

Left Hemisphere Center for:

- Language - words
- Mathematics
- Numbers
- Logic
- Reasoning
- Sequence

The corpus callosum links both.

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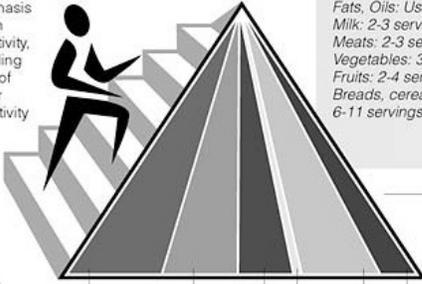
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Nutrition and the Brain

NEW PYRAMID RECOMMENDATIONS

A new emphasis is placed on physical activity, recommending 30 minutes of moderate or vigorous activity a day.



Examples of food intake guidelines:

GRAINS VEGETABLES FRUITS FATS MILK

OLD PYRAMID RECOMMENDATIONS

Fats, Oils: Use sparingly
Milk: 2-3 servings
Meats: 2-3 servings
Vegetables: 3-5 servings
Fruits: 2-4 servings
Breads, cereals: 6-11 servings



The different proportions of the bars representing food groups indicate their importance. A wider base represents higher suggested intake.

Some basic suggestions



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Coke vs. Water

1. In many states (in the USA) the highway patrol carries two gallons of coke in the truck to remove blood from the highway after an accident!

2. You can put a T-bone steak in a bowl of Coke and it will be gone in two days.

3. To clean a toilet: Pour a can of Coca-Cola into the toilet bowl and let the "real thing" sit for one hour, then flush clean. The citric acid in Coke removes stains from vitreous China.

4. To clean corrosion from car battery terminals: Pour a can of Coca-Cola over the terminals to bubble away the corrosion.

5. To loosen a rusted bolt: Applying a cloth soaked in Coca-Cola to the rusted bolt for several minutes.

6. To bake a moist ham: empty a can of coca-Cola into the baking pan, wrap the ham in aluminum foil, and bake. Thirty minutes before the ham is finished, remove the foil, allowing the drippings to mix with the Coke for sumptuous brown gravy.

7. To remove grease from clothes: Empty a can of coke into a load of greasy clothes, add detergent, and run through a regular cycle. The Coca-Cola will help loosen grease stains.

8. It will also clean road haze from your windshield.

1. 75% of Americans are chronically dehydrated.

2. In 37% of Americans, the thirst mechanism is so weak that it is often mistaken for hunger.

3. Even MILD dehydration will slow down one's metabolism as much as 3%

4. One glass of water will shut down mid-night hunger pangs for almost 100% of the dieters studied in a University of Washington study.

5. Lack of Water, the #1 trigger of daytime fatigue.

6. Preliminary research indicates that 8-10 glasses of water a day could significantly ease back and joint pain for up to 80% of sufferers.

7. A mere 2% drop in body water can trigger fuzz short-term memory, trouble with basic math, and difficulty focusing on the computer screen or on a printed image.

8. Drinking 5 glasses of water daily decreases the risk of colon cancer by 45%.

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9. The active ingredient in Coke is phosphoric acid. Its pH is 2.8. It will dissolve a nail in about 4 days. Phosphoric acid also leaches calcium from bones and is a major contributor to the rising increase in osteoporosis.

10. To carry Coca-Cola syrup (the concentrate) the commercial truck must use the Hazardous material placards reserved for Highly corrosive materials.

11. The distributors of Coke have been using it to clean the engines of their trucks for about 20 years!

9. Drinking 5 glasses of water daily can slash the risk of breast cancer by 79%.

10. Drinking 5 glasses of water daily makes a person 50% less likely to develop bladder cancer.



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Now the question is, would you like a coke or a glass of water?

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