Brain Development (and how parents can help)

By Janelle Durham, Parent Educator, Bellevue College. www.gooddayswithkids.com

How the Brain Develops:

First, some vocabulary:

- Neurons are brain cells - the raw material that helps us think and helps our bodies to work
- Synapses are connections between neurons that help them process information and take action
- Myelin is a fatty substance that insulates nerve fibers and helps messages travel quickly

When a baby is born, his brain is ¼ the size of an adult's. He's got as many neurons as an adult, but not many connections. A baby's job in the first 3 years is building connections and myelination. By age 5, a child's brain is 92% of adult size, with over 500 trillion synapses. That's a lot of brain growth!

Brain Building Block #1 – Real World Experiences and Time to Explore & Master Them

Babies build connections through hands-on, in-person experiences where sight, sound, smell, taste, and touch are all active. No matter what marketers tell you, there aren't any special toys, tools, apps, or baby classes that you absolutely have to spend money on if you want your child to grown and learn. Everyday items and activities – like a trip to the grocery store, a bubble bath, singing songs, tasting a fresh peach, smelling a flower, and playing with spoons – are all great ways to build a brain!

What inspires learning:

1. Novelty – the first time your child sees, hears, or tastes something new, she'll look attentive and puzzled, taking it all in. She's wiring connections in her brain for the next time she sees it.
2. Repetition – the more times a child does something, the stronger the connections, and the easier it becomes to do it again. With enough repeats, connections become permanent and tasks become effortless. (Think about tying a shoe or riding a bike – once you learn, it's easy!)

So, expose your child to plenty of new experiences, and give her new things to explore. A cardboard tube, a measuring cup, a toothbrush… Allow her to explore things in depth. Let her do the same thing over and over to learn. Don't push her to move on to something new. If she becomes "bored" of a toy, have her keep on playing with it. Soon she'll discover something new and interesting.

Brain Building Block #2: Sleep and Quiet Times to Process New Information

Don't overdo things… When a young child is interacting with the world, every sight, sound, smell, taste, and touch is being filed away for future reference. This is why kids can be so wild and over-stimulated after a busy day. They need time to rest quietly and integrate all the new information. So get out and explore, but also plan for down time and naps. And have times during the day when you're "ignoring" your child and not "entertaining" him. Some important discoveries happen when he learns how to entertain himself and has time for self-guided practice of new skills.

Brain Building Block #3: Good Nutrition

When brains are growing, they need a LOT of energy… a toddler needs 1000 – 1200 calories a day (e.g. a cup of fruit, a cup of veggies, two cups of milk, 2 ounces of protein foods, and 3 ounces of grains.) Especially important are healthy fats (like omega 3's), as myelin fibers and cell walls in the

brain are composed of fats. One other thing they really need is plenty of water to drink – the brain is 60% water. Breastmilk is a great brain builder for babies and toddlers.

Brain Building Block #4: Safety and Happiness

We learn from interaction with the objects in our world, but we especially learn within the context of relationships and emotions. We learn best when we're happy. When we're feeling loved, and cared for, and safe, our system floods with oxytocin (the "love hormone") and our brains have a high level of "neuroplasticity" – we are open, flexible, and primed for learning. And we want to remember the things we're doing, and we want to repeat them over and over. That reinforces the learning.

When we are stressed or frightened, our brain goes into survival mode – fight or flight – and we're less open to learning. We *can* learn when stressed, but what we learn is how much we want to avoid having that experience again! Children don't like to return to a task that was unpleasant to learn.

The brain is built in stages

At birth, the *brain stem and spinal cord* are mature. They handle breathing, eating, pooping, etc. Newborns only have 2 emotions: happy (needs met) or unhappy (needs unmet or system overload). If babies are happy and their needs have been met, then they can go on to next stage of learning.

Next to develop, from birth to grade school, is the *sensory cortex (occipital, parietal and temporal lobes)*, which handles vision and balance, touch, hearing and language. We can help these develop by offering lots of diverse experiences which involve all 5 senses, lots of free play, and lots of movement.

From 8 month to 2 years, the *limbic system* develops. It's responsible for long term memories and emotions. As it develops, children begin to self-soothe – to calm themselves down from upset. Our loving touch, soothing words, consistent responses, and a safe environment help it to develop.

From pre-school to early adolescence, the *cortex* develops, which manages concrete thinking, categorizing, associating. School, organized sports, and music are great for building the cortex.

The *pre-frontal cortex*, which handles executive functions of the brain – thinking, planning, reflecting, reasoning, abstract thinking, judgment develops from adolescence through age 22 – 25. Giving your teenager room to make plans and choices – and live with their consequences – will help it develop.

Respect their capabilities

It's hard to learn something before the brain is ready for it. If there's something you and your child are struggling with, ask yourself whether your expectations are developmentally appropriate. You can research developmental milestones, or observe other kids – what do they all seem capable of?

For example, if you tell a toddler "don't throw that rock at your brother", she is not developmentally capable of coming up with a different plan for what to do instead – that's a pre-frontal cortex skill and won't come for years! Her brain, with limited connections and the myelin sheath just forming, has a hard time even figuring out what you've just said. She may just stare blankly at you. Or she may think back to the *verb* they heard you say… hmmm…. What was that verb? Ah, throw! And she'll throw the rock. You'll find it's more effective if you slow down, look her in the eye, and re-direct her with a clear plan of what *to do*: "it's OK to throw the rock in the water. Let's go to the water." You'll watch her listen, think, then process for a moment, then have the a-ha moment, and then do what you asked. And that's when she feels happy and safe. It's even harder for her to figure things out when she's under stress. So be patient with little ones as they grow those brains.