CHAPTER 2

Rapid Learning for Two and Three Year Olds

Since the 1980s, there has been a tremendous explosion of research from neurology about human brain structures and their function. The breathtaking progress of scientific developments can be seen in brain-imaging techniques which identify brain activity when a child is engaged in various learning activities. This chapter has been redesigned from *Building the Reading Brain*, second edition, to describe the rapid expansion of the very young human neurological system. The reader is encouraged to look for the BIG picture of brain development for the Oral Language Pathway. Another name for this chapter could be *Understanding the Human Brain*. An overabundance of brain terminology is necessary. Although some will want this level of explanation, other readers may decide to grasp and understand the generalities of the human brain as it builds itself for receptive oral language. The chapter's emphasis is on the toddler and the prior-to-school years.

Another focus is on the adults who surround the children—what can they do? For adults it is easy to become immersed in the excitement and fun that accompanies the abundance of new developments for toddlers. Parents and care providers find that the spontaneity of play, and the joy of learning appear to come so easily. What is witnessed on the outside is no indication of what is happening in a child's brain.

A continuation of the Developmental Benchmarks is provided. Additionally, the reader will find a list of skills for cognitive brain development. These areas of development are more difficult to observe, but equally important to understand as

parents and educators support a child's developing brain. Areas of attention for visual and auditory input and discrimination for phonemic awareness, are defined in a chart format. Note the cognitive aspects of brain development are directed at the three year old. Now is the time in this study for serious discernment of how the *nature* of the human brain designs itself through the *nurture* of the environment, to operate with effectiveness and efficiency for the continuation of the child's life.

LANGUAGE DEVELOPMENT FOR 2 AND 3 YEAR OLDS

By age 2, nearly all children have between 100 and up to 300 words in their vocabulary. Between the second and third birthday youngsters learn two to three words a day (Johnson, 2019). They begin to combine words to form simple phrases. These phrases are usually word sequences they hear frequently in the speech of others. The words are spoken in what is called "telegraphic speech"—short phrases containing basic information such as "All gone" or "Daddy play ball." Children's neural pathways for language develop rapidly, and between 24 and 30 months, their sentences become longer and more complete. The child's brain is not only going through a language explosion, but through a grammar explosion as well. Children are at this stage are beginning to analyze the longer patterns of words they hear, and are experimenting with some rules. For example, they figure out that you add an "s" for plurals and "ed" for past tense. Parents and other adults are advised not to correct, rather accept children's language use during this time, as children are very good at finding their own errors and matching their language to those around them. Correcting them could actually discourage the young ones from trying new words and phrases (McPherson, 2022).

THE IMPORTANCE OF LEARNING TO TALK

There is no way to underestimate the importance of learning to talk and communicate through language. As previously emphasized building a strong foundation at the toddler age is critical to reading success during the school years. As 2 year olds advance, with a rapidly expanding number of words in their vocabulary, they begin to combine words to express simple phrases. Next their sentences become longer, and the ideas they convey are more complete and complex.

As exposure to books increases young children observe how others enjoy and even cherish their books. They learn how to hold a book and turn the pages. An amazing thing happens when a child can identify a picture of a real thing, saying and identifying a flat, colored picture with lines and shapes, as a real ball, a teddy bear, or more amazing an image of a child or parent. Can you envision how many parts of the young brain were activated to identify a real thing from a flat illustration? This activity is important, and a similar outcome is expected later when a written word, a noun, is identified with an actual object.

A RECENT STUDY ABOUT ATTENTION

A study was conducted to examine the function of infant attention and the education level of their mothers, to find out if either had an influence on receptive vocabulary development (a priming and cognitive skill). Researchers Bruce, Miyazaki, and Bell (2022) conducted a study with 313 children. The researchers measured visual attention beginning at 10 months with a dynamic puppet task. The assessment continued with children at ages 3, 4, 6, and 9 with the Peabody Picture Vocabulary Test, which measured listening and understanding of single word vocabulary. Results showed that both child attention and higher levels of maternal education are predictors of receptive vocabulary progress, beginning from early preschool through the elementary years. Boys demonstrated a slightly faster rate of receptive language development, as compared to the girls. Interestingly, these findings more importantly indicate that without accounting for the sex of the child or the education level of the mother, the ability of young to older children (up to age 9) *to attend was the most important factor.* To attend and focus/concentrate on pictures and pay attention to verbal cues, are indicative of ability for receptive oral language. Children who are able to attend are working on building a strong oral language pathway in their brains. Attention is the first of the priming skills that will be identified and connected with cognitive skill development.

Evidence continues to support prompting youngsters with a rich environment of language and visual stimulation. Being able to sustain attention to what is going on in the child's environment is a key to learning. N*euroscience* research gives a clear understanding of how language develops cognitively; the *Science of Reading* explains how best instructional practices and instructional methodology provide the process for teaching reading.

MORE DEVELOPMENTAL BENCHMARKS

The initial developmental benchmarks for youngsters beginning at birth are extended here for the second and third years. Developmental benchmarks are apparent from children's actions and can be observed by others. Remember these descriptors are from a variety of sources and have importance for their suggestive/predictive activities. They are not based on scientific study. Appendix A at the end of the book provides the complete chart of benchmarks from birth through age five.

Developmental Benchmarks

2 Years	Builds with blocks. Explores how toys work. Can follow simple two step directions. "Pick up the blocks and put them in the box." Plays make believe games. Can name pictures in a book. Side note: this is a complex task to recognize an abstract picture of a physical item. Speaks in simple sentences and recites rhymes. Kicks a ball, runs, walks without help. Eats with a spoon. Can point to at least two body parts. Increased number of gestures. Notices when others are upset. Uses many gestures like blowing a kiss or nodding yes. Recognizes books by their cover.
3 Years	Can fit three to four pieces to complete a puzzle. Can draw a circle. Enters into make-believe play. Has the concept of one and two items. Sorts objects by shape and/or color. Can identify common colors. Can open a door handle. Plays next to other children and sometimes with them. Follows simple routines. Pretend plays, like reading a book, flying like a bird, or feeding a doll. Turns the pages of a book one at a time. Handles books a specific way. Can label known objects in books, including characters. Looks at specific print, such as letters in a name. Occasionally distinguishes between drawing and writing. Talks well enough for others to understand. Can identify animals, their actions, and sounds they make. Draws a circle with instruction. Can help with getting dressed.

These guidelines can be applied to young children as a model and guide for families and care providers.

WHAT IS KNOWN FROM NEUROSCIENCE?

An explanation of the structures of the brain, and identification of some important functions of the human brain make language development explicitly understandable. The human brain is no longer considered to be "a black box." Educators

AQ1 **TABLE 2.1** ● Definitions for Neuroanatomy and Neurophysiology.

NEUROSCIENCE	
Neuroanatomy	study of the *structure and organization* of the central nervous system
Neurophysiology	study of the *function* of the central nervous system

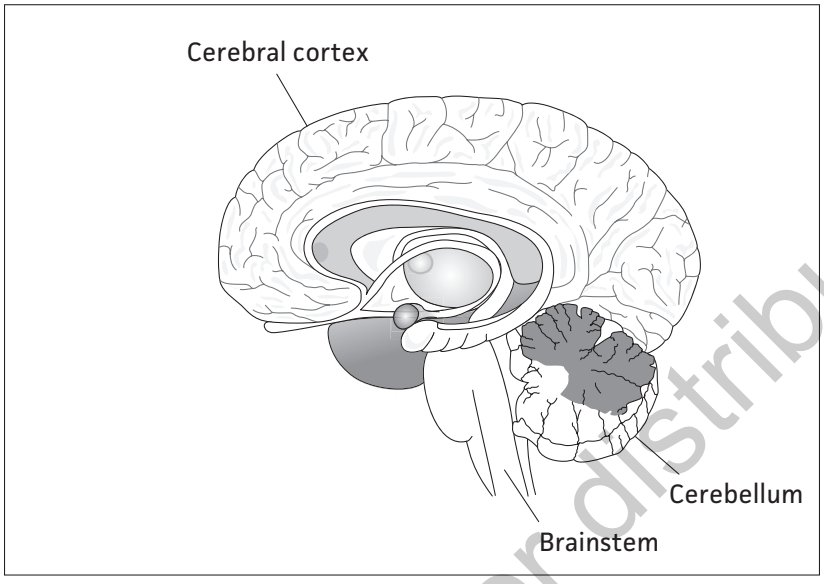
communicate with neuroscientists, and the two disciplines have found common ground. Education draws from two different aspects of **Neuroscience**, which is an understanding of the nervous system. *Neuroanatomy* is the branch of neuroscience focused on the *structures* of the system, while the *functions* of the system are the focus of *neurophysiology*. Working together and uniquely separate, these two systems of study focus on the human central nervous system (the brain and spinal cord) and the peripheral nervous system (the cranial and spinal nerves) which carry information from the body via the spinal cord to the brain for interpretation.

Imaging machines, while available and non-invasive even to infants, are not required for information from neuroscience to be applicable to home and classroom practices. Although these two very different fields do not speak a common language, educators interpret and apply information from neurological science for instructional purposes. The insights about brain structure, brain organization, and function can be deciphered. This information helps to explain what educators and parents observe as children build their brains during childhood. Observation of children's behavior is boosted by knowing the difficult tasks the brain performs to build the circuitry supporting listening, understanding, and speaking. Cooperation between these two professions provides valued and essential information about cognition and learning. The significance of understanding the human brain is for parents, care providers, and teachers to be informed of *what they can do, why they do it*, and *how the emerging young reader will benefit*.

EXPLAIN A CHILD'S BRAIN AT AGES 2 AND 3

The discipline of neurology explains how information is known about the very young and also about the adult brain. At this early point of the book a deep delve into all that is happening in the toddler brain is needed. The reader is encouraged to think through the following sections, not being overly concerned with the terminology, rather focusing on the process of the brain structures and systems.

FIGURE 2.1 ● Three Distinct Parts of the Brain are the Cerebral Cortex, the Cerebellum, and the Brain Stem. AQ2



Source: Nevills (2014).

The human brain controls conscious parts of the central nervous system. Children think to direct their movements as they walk and speak, but they also are able to breathe, digest food, and blink their eyes without any conscious thought. Knowing the basic design of the human brain is essential to understand the complex gyrations the brain undergoes to progress from a child capable of speaking to a child who possesses a brain for reading. The reader is directed to the Glossary at the end of the book, for neurological or technical terms for reading, as they are needed.

THREE DISTINCT BRAIN PARTS

A child's brain can be depicted with three major areas of development. First, the main structure, and also the largest, is the **cerebral cortex**, where signals from the senses are received for interpretation. The result of activity in the cerebral cortex allows one to learn, think, solve problems, interact, and remember.

The **cerebellum** is at the back of the cerebral cortex and may be called the "little brain." Neuroscientists continue to learn new attributes for this structure. For these purposes it is known that this structure is called into action when something is learned to a proficient or automatic level, thus freeing the cerebral cortex from directing the activity. A toddler who walks easily no longer has to concentrate on the work of walking; it

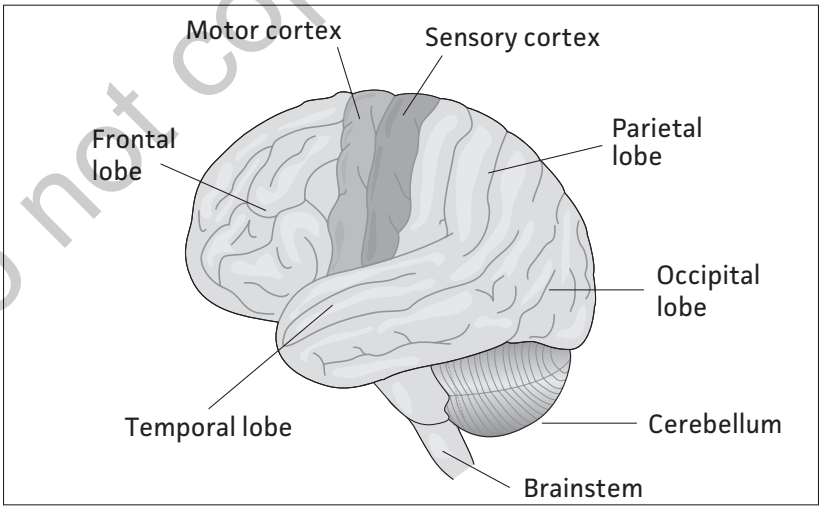
happens naturally through the coordinated movements of the cerebellum. Likewise, after practice a young child can turn the pages of a book with automaticity, giving way for the child to look pensively at the pictures. Humans can only concentrate on one thing at a time. If it appears otherwise, it is because the individual is good at rapidly switching from one thing to another, or even to a variety of things, while holding each in conscious memory. The cerebellum allows a person to do one or more things unconsciously, while focusing on something else that is mentally attractive. Scientists continue to discover other ways the cerebellum is involved with learning processes.

The third part of the brain's central nervous system is the **brainstem**, which is the stalk-like feature that connects the cerebrum with the spinal cord. The brainstem has three parts, the *midbrain, pons*, and *medulla*. For the purpose of this study the explanation of this third part of the brain is limited. Simply put, it unconsciously regulates many of the body vital functions, like breathing, heart rate, balance, coordination and reflexes.

THE CEREBRAL CORTEX'S TWO HEMISPHERES AND FOUR LOBES

The **cerebral cortex** is divided into two distinct parts, a *right* and a *left hemisphere*. The two parts of the brain are connected by the *corpus callosum*, which is a bundle of nerve fibers that allows the corresponding regions of the two hremispheres to

AQ3 **FIGURE 2.2** ● The Cerebral Cortex has two hemispheres. This figure shows the Left Hemisphere with the four Lobes and two Cortices.



Source: Nevills (2014).

TABLE 2.2 ● The Cerebral Cortex Divided Into Four Lobes and the Two Cortices Described Earlier, the Motor Cortex and the Somatosensory Cortex. AQ4

Occipital Lobes	One of the four major divisions of the cortex located in the back of the brain and responsible for the processing of visual stimuli. (Vision)
Parietal Lobes	These lobes are between the occipital lobes and frontal cortex. The lobes integrate information from the senses and determine well-being or danger. (Feelings)
Temporal Lobes	Located near the ears, these lobes process auditory information and some aspects of memory. (Hearing)
Frontal Lobes	The largest of the brain's lobes and located at the front of the brain. They are directly involved with every other functional unit for response and complex thinking. (Thinking)

communicate. Although this connection between the hemispheres is minimally functional at this young age, it will not completely mature and be totally effective until adulthood. Communication between the two parts of the brain are important. Both hemispheres are needed to understand the messages that come to the toddler's brain through the five senses.

Each hemisphere in the cerebral cortex has four lobes: *frontal, parietal, temporal*, and *occipital* along with the motor and somatosensory areas. The first chapter identified the motor and somatosensory strips, and their important role for early movement, and for *receiving input* from the environment through the five senses. Now the understanding of the brain and its' design goes a step further. The lobes are where *the stimuli from the environment are interpreted*. A summary statement is made for each of the four lobes.

For readers who want to take a deeper dive into brain terminology, an expanded explanation of each of the four divisions follows.

TERMS DEFINED:

Occipital Lobes—Starting at the very back of the human brain are the occipital lobes, which are primarily responsible for receiving and interpreting visual stimuli. The cortex covering the occipital lobes is called the *visual cortex*. The occipital lobes take visual images from the eyes to interpret and identify what the child is seeing.

Parietal Lobes—Between the occipital lobes at the back of the brain and the frontal lobes in the front of the brain, and behind the motor and sensory cortices, described in Chapter 1,

are the parietal lobes. This pair of lobes additionally is located directly above the thalamus, which is defined later, as the human brain's information relay system. The ideal placement of the parietal lobes allows them to receive tactile (pressure, temperature, pain) and other sensory information (visual and auditory). The parietal lobes are responsible for integrating all this information with the executive functions of the frontal lobes through working memory. In this case, information is maintained in the mind (mindfulness), while the child reacts or ignores the feelings experienced (Pence & Justice, 2008). Additional functions of the parietal lobes determine a general sense of well-being, safety, discomfort, or potential danger. All of these interpretive reactions have potential to determine a state of readiness for paying attention and learning.

Temporal Lobes—Located on the sides of the brain above the ears are the hearing parts, the temporal lobes. The cortex covering them is called the *auditory cortex*. The temporal lobes are responsible for receiving and interpreting auditory stimuli, or more commonly understood as "noise" in the environment. Structures within the temporal lobes also control the production of speech and many aspects of memory. Notice how the location of the temporal lobes for the habits of listening are located next to the ears.

Frontal Lobes—Right behind the forehead and extending back over the top of the brain are the frontal lobes. This frontal area of the human brain encompasses slightly less than half (between 38.5 to 41 percent) of the cerebral cortex and is involved with conscious decisions and behaviors. Referred to as the "chief executive officer" of the brain, the frontal lobes are responsible for problem solving, dealing with abstractions from sensory information, and future planning. An older child or an adult will access the frontal lobes for other higher-order thinking skills of association, comprehension, evaluation, analysis, and synthesis.

When school-aged children are engaged in demanding cognitive tasks, neuroscientists see images of heightened activity in the frontal lobe areas of the brain. Due to these intense activities science refers to the area covering the frontal lobes as the association cortex.

THE ORAL LANGUAGE PATHWAY

Realizing a young child is able to understand and act upon hearing a command while also producing recognizable words, is cause for excitement. Although, all this happens spontaneously, what is happening in the child's brain is nothing short

of brilliance. The story of the oral language pathway is best understood by Figure 2.3a.

Once again there are many areas of the brain that need to be described for this figure to be understood: *Thalamus, Auditory Cortex, Herschl's Gyrus or Area, Wernicke's Area, and Broca's Area*. The areas described work together for listening and speaking to become refined. Know here that what the brain has accomplished to prepare the young one to listen and speak is unimaginably intricate. *The purpose of the oral language pathway for listening and speaking is not for the reader of this book to remember all the technical terms*. Rather, it is to comprehend the complexity of the process that happens in the child's brain to listen, understand, and speak.

TERMS DEFINED:

Thalamus—A relay station in the central, inner area of the brain for incoming signals from all the senses, except the sense of smell, and an output mechanism for sensory stimuli as it is sent to areas of the cerebral cortex for interpretation. (Figure 2.3a.) AQ5

Auditory Cortex—located in the temporal lobe and provides the ability to listen to sounds or words, holds them in working memory, and pulls sounds together to make a word.

Heschls's Area—A small left temporal region where auditory input is rapidly processed as speech or language, rather than sounds not relating to words.

Wernicke's Area—The language center responsible for comprehension of speech. It is typically located in the left hemisphere.

Broca's Area—The central region for the production of speech and processing of syntax. It is also most likely located in the left hemisphere.

Motor Cortex (defined in Chapter 1)—The lateral part of the frontal lobes that extends from ear to ear across the roof of the brain. It governs coordination of movement and some cognitive processes. In the oral language pathway it directs the mechanical process for speaking. The motor cortex may also be referred to as the motor strip.

Reading to children produces distinct benefits for several reasons. First, it increases their vocabulary and helps them become familiar with language patterns. Next, repetition increases the strength of neural connections. Finally, reading the same book to children repeatedly—which they love—serves to reinforce familiar words. Children often become so

FIGURE 2.3A ● Diagram of the Oral Language Pathway in the brain.

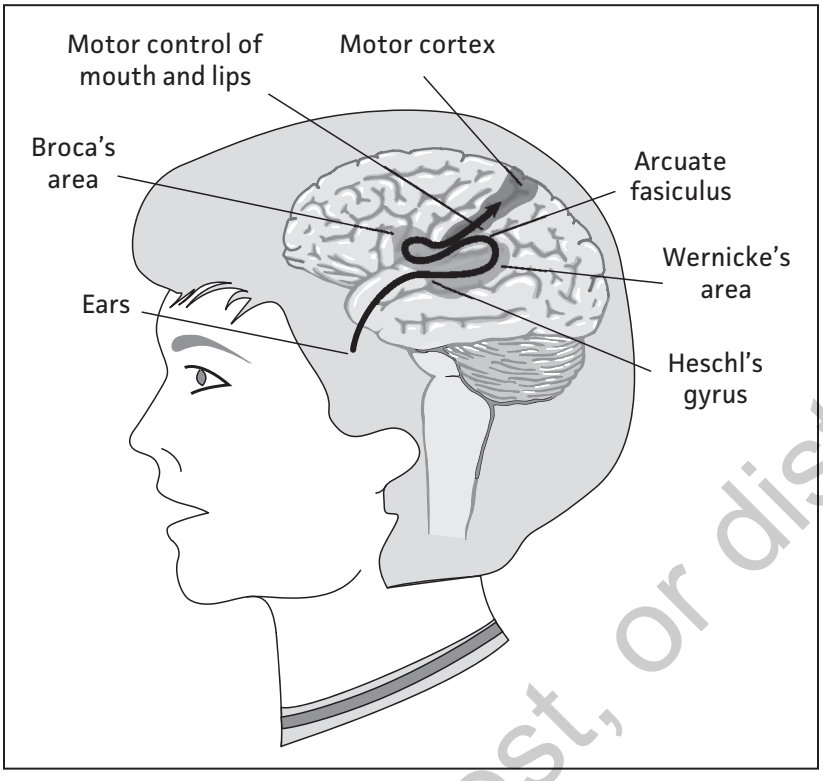
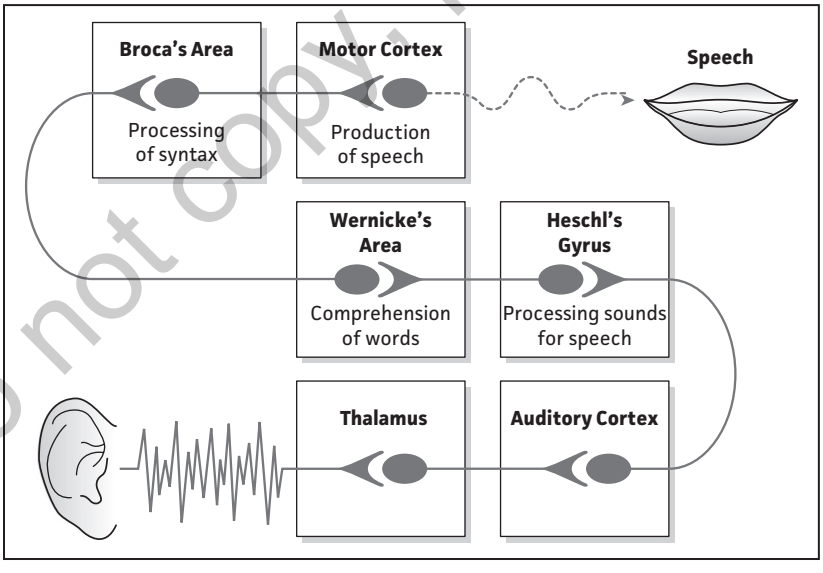


FIGURE 2.3B ● Flow Chart of The Oral Language Pathway for listening and speaking.



familiar with the vocabulary of a favorite story, that they can "read" it with an adult, pretend to read it to a sibling, or recite it to one of their stuffed animals.

What is happening neurologically for a three year old while an adult or older child reads out loud and talks to the child? Refer to Figure 2.3b. The primary **auditory cortex,** the interpretation center for hearing, becomes activated. Children respond to the sounds they hear every day. **Wernicke's area** is alerted as a youngster hears new and familiar words, and makes connections to pathways to vocabulary already stored in memory. The networks for vocabulary become stimulated, fortified, and consequently more accessible. Also activated are the **motor cortex** and **Broca's area** to speak, repeat, and reinforce new sounds, words, and ideas. Knowing the complex process for oral language to develop helps parents and educators to appreciate the hard work that is involved for youngsters. They seem to engage with this tough work with continued curiosity.

The oral language pathway develops naturally. The human brain is designed to enable children to learn to listen, comprehend, and speak. In succeeding chapters as reading is introduced, the difference between the language pathway and the reading pathway will be stressed. Oral language develops spontaneously, without teaching, in a language rich family environment. Reading does not just happen naturally for most children. The human brain does not "take to" reading without explicit instruction. To form the reading pathway the language pathway must be rerouted, redesigned, and coerced to form a new route. The reading pathway is developed through explicit instruction and repetitive practice. The building process for reading is found in Chapters 5 and 6.

ACTIVITIES TO SUPPORT DEVELOPING READERS

In this section the reader will consider how the activities of the oral language pathway are activated as a child listens to someone read. Other topics that teachers and parents can use to encourage the advancement of language skills include using nursery rhymes and initial writing activities. With the advanced age of technology it might seem that nursery rhymes are obsolete. Quite the contrary they remain engaging and critical to encourage careful listening to the sounds of language. Writing, also, comes to front and center as children develop the motor skills to hold a writing tool and desire to express what they are thinking.

LISTENING TO SOMEONE READ OUT LOUD

Reading to children encourages familiarity with the reading process. A two or three year old child has much to learn about print—how the book is turned when it is "right side up;" that the print, not a picture is read; and that you start at the beginning of the page and after finishing that page, turn to the next. Children learn about reading by observing others read to them. The benefit of reading to a child is further enhanced when the reader involves the child. The adult may pause and let the child supply the next word. "The dog and her puppies were under the tree. I counted them, one, two, _____." Showing the pictures and asking a child to point to, name, or count persons or objects is another form of involvement. Child connection to the book is more important than "completing the story." Other ways to involve the youngster include encouraging the child to retell the story. "How did the story begin?" What happened next?" And, "How did it end?" Asking the youngster how they felt when the story was read, or what their favorite part was, might also be appropriate conversation for some children. Discover and rehearsal activities stimulate the child's memory, and draw on background knowledge to reinforce learning.

THE NURSERY RHYME EFFECT

Cluck, Cluck, Cluck

Cluck, cluck, cluck, cluck, cluck,
Good morning, Mrs. Hen.
How many chickens have you got?
Madam, I've got ten.
Four of them are yellow,
And four of them are brown,
And two of them are speckled red
The nicest in the town.

Why is a nursery rhyme in a book on reading? The response is that when similar or repetitious sounds are voiced, they excite parallel brain cells and their connections. As these sounds are heard repeatedly, the neuron connections become stronger, and the sounds become more easily recognized as familiar. The young child's brain begins to distinguish between sounds that are alike, and those that are different. This process is essential for phonemic awareness and, as such, will be explored in Chapters 5 and 6. The progression, beginning with phonemic awareness moves into the realm of phonological processing for rapid word identification. Researchers have discovered that nursery

rhymes are not just to soothe babies. Rhythm and language patterns from nursery rhymes and poetry encourage young children to develop a discerning ear for oral language. Readers of this book will most likely agree that nursery rhymes have not lost their effectiveness. There is no denying the importance of age-old, rhythms and rhymes and their new age additions, as well. Nursery rhymes are so well loved that Claire Bennett from Professional Association for Childcare and Early Years, PACEY, featured them at a blog during "nursery rhyme week." (2019). Reasons cited included development in the areas of: language, cognition, social/emotional, memory, comprehension of new words, listening, phonology, movement, and on. There is no denying the importance of age-old, rhythms and rhymes, and their new age additions, as well.

PRECURSORS TO WRITING IN THE FIRST 3 YEARS

Reading and writing skills develop together. While children generally do not start writing letters and words until around age 4, there are many opportunities for parents and caregivers to encourage writing behaviors earlier. Between 12 and 15 months little ones can be provided with resources for drawing or coloring and be encouraged to experiment making marks. Children can be offered a wide range of media as they express interest in drawing, and develop what is called the pincer grasp (holding objects between the thumb and pointing finger.) A fat crayon is a good beginning tool. A crayon is used to make marks like large random arcs, blobs, and unintentional scribbling. As more interest is shown include finger paints, clay, and Play-Doh, which are all good materials to use indoors, and step it up to "painting" with water or drawing with chalk on sidewalks for older children to experiment outdoors. Parents also have opportunities to model or demonstrate the uses of writing by signing the child's name to a birthday card, writing an item a child wants on a grocery list, writing the date a book is due at the library on a calendar, or writing a letter to a grandparent as the child dictates.

Children pass through several stages as they develop their skills in writing. The first stage could be called *early scribbling,* where the child makes random marks on paper. Children at this stage are probably more interested in the physical experience than in what is being marked on the paper. As children's motor skills develop, the marks become more controlled, with efforts to draw a straight line or a circle. This stage could be labeled *controlled scribbling*. At this time, some children begin to distinguish between drawing and writing. With vertical lines

AQ6 **TABLE 2.3** ● Early Writing Stages From Scribbling to Letter Forming.

Early Scribbling	Random marks
Controlled Scribbling	Draws straight line or circle
Pictorial Stage	Distinguishable marks
Letter Stage	letters represent words

under a picture, the child may ask, "What did I write?" or "How do you write 'Daddy'?" The third stage might be called the *pictorial stage,* where the marks and forms begin to be distinguishable. This stage is when the child understands that pictures and words are different symbols. In the final stage, which could be labeled the *letter stage,* young children begin to write letters to represent words and syllables and may be able to write their own names.

COGNITIVE DEVELOPMENT

Chapter 1 identified that what is happening in a child's brain as they learn, is difficult to assess. A child's cognition progresses from abilities for paying attention to development of simple concepts. The fields of *cognitive psychology* and *cognitive neuroscience* come together in useful ways to help educators and parents understand skills that are more difficult to observe. Skills for early language are not as outwardly apparent as the developmental benchmarks given earlier. Cognitive psychology explains **mindfulness.** Mindfulness holds concepts and ideas in mind for consideration. Educators can determine abilities of mindfulness by observation, but it is a more difficult task than to determine developmental milestones. Mindfulness deals with brain activities, including attention, concentration, memory, recall, and concept development. Cognitive neuroscience explains what is actually happening in the brain while children perform a task, such as speaking or reading.

The summary of developmental benchmarks, provided earlier in this chapter, is now augmented with the cognitive brain development skills for 3 year olds. The reader is directed to notice the importance of attention and focus, mentioned earlier in a study summary. The cognitive areas addressed for these very young children are: sustained and selective attention for visual and auditory input, visual processing and discrimination, and auditory processing for phonemic awareness. Cognitive actions incurring in the brain require close observance to how children process information. Information from the

Cognitive Learning Skills Chart can be shared with parents as they search for ways to support their child's progress.

Some developmental areas cover a two year period. This list is the author's summation from many sources, and is an indication or guide to development over the period of time from 2 to 4 years of age. A complete list of Cognitive Skills from 1 to 12 years is located in Appendix B.

COGNITIVE LEARNING SKILLS

Attention

1–2 Years	**Visual and Auditory Sustained Attention**— Sustains interest without adult intervention for an elongated period of time. Watching the lips of a speaker and attempting to reproduce the same sound. Tracks and follow the actions of another person. Engaging in play alone or with another child for a sustained time. Explores toys and moves around. Tries switches, knobs, and buttons on a toy. Holds something in one hand while using the other hand for a task.
3 Years	**Visual and Auditory Selective Attention**—screens out distractions for focused attention. Attends to a task in a place where visual and/or auditory interferences are happening. Such as, Mommy and Daddy are having a conversation, and may be moving, but the interesting thing at hand is more important to the child. In a preschool classroom many other children are talking and moving around, but the drawing the child is doing captures the child's focus. Calms down within 10 min, Joins other children to play. Asks *who, what, where, why* questions. Can identify actions in a picture book. Knows to say own name. Talks well enough to be understood. Draws a circle. Avoids dangerous things. Can mostly dress self. Uses a fork. Can string beads.

Visual Processing

3 Years	**Visual Discrimination**—distinguishing differences among items—objects, shapes, colors. More advanced, *but not necessary* at this age, identifying some letters, numbers, sight words, larger numbers beyond 1 and 2.

Auditory Processing for Beginning Phonemic Awareness

3 Years	**Discrimination**—distinguish differences among sounds. Listening and attending to simple nursery rhymes. Listening to words to identify if they start or end with the same sound. Examples: man, monkey, milk or funny, sunny, bunny. Can say individual sounds for two and three letter words, such as c-a-t, d-o-g, s-a-t. Notice this cognitive activity is about sounds from spoken words, and about sounds, *not letters*.

Parents and care providers are encouraged to use this chart for suggestions of brain type activities that identify and encourage the child's journey to develop a thinking, pre-reading brain. Notice how the world of language opens the many ways children can be enjoyed and also encouraged.

CONCLUDING THOUGHTS ABOUT 2 AND 3 YEAR OLDS

Learning to talk is probably one of the greatest accomplishments of an individual's life. Structures for language are hardwired in the brain. Nearly all children learn to speak, but humans are obviously not born speaking. In this chapter, we have seen that the first three to four years of life are a cognitively critical period for developing children's language capacity, vocabulary, and beginning writing skills. The environmental aspects of children's lives: (1) their experiences, (2) whether they are read and talked to, (3) the opportunities they have to experiment with writing, and (4) new discoveries provide an important role to build their brains with a strong foundation of neuron connections. It is the networks of neural connections, which prove critical for later reading success. The following chapter takes a look at the next year or two to see how the brain continues its rapid development for learning and language. At the onset of universal kindergarten or the beginning of formalized education for 4 year olds becomes a reality, studying the neurological aspects of language development allows understanding of how children at age 4, may or may not be ready for the rigors of a classroom learning environment.

Reflective Questions

1. How might you use the Developmental Benchmarks for yourself or to share with parents?
2. The cerebellum or little brain at the back of the brain is curious, yet very prominent and important for all parts of human development. How would you explain the cerebellum?
3. How would you define the cerebral cortex?
4. What is so different about learning to speak and learning to read?
5. Identify the stages of development children follow as they begin to write. Give some activities that support youngsters, as they develop writing skills.
6. This chapter is full of how neuroscience explains the parts of the brain. Ultimately these brain areas will be used to identify the reading pathway featured in following chapters. What do you want to remember from this chapter that will be practical "brain" information for reading this book, and for understanding and selecting teaching practices?