

Brain Development from One to Three

Reading Guide

Before You Read

Restating Definitions Knowing the meanings of vocabulary words is vital to understanding what you are reading. Locate the content vocabulary words in this section. Read each word's definition. Then restate the definition using your own words.

Read to Learn

Key Concepts

- **Summarize** how heredity and the environment shape intelligence.
- **Describe** the four methods of learning used by young children.
- **List** the seven areas of intellectual activity.

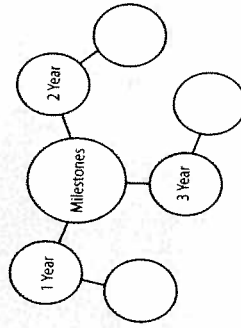
Main Idea

Both heredity and environment play major roles in the development of a child's intelligence. Intellectual activity becomes increasingly complex.

Content Vocabulary

- ◇ neuroscience
- ◇ intelligence
- ◇ incidental learning
- ◇ trial-and-error learning
- ◇ imitation
- ◇ directed learning
- ◇ creativity

Graphic Organizer Go to this book's Online Learning Center at glencoe.com to print out this graphic organizer.



Academic Standards

English Language Arts

NCTE 5 Use different writing process elements to communicate effectively.

Mathematics

NCTM Data Analysis and Probability Select and use appropriate statistical methods to analyze data.

Science

NSES 1 Develop an understanding of science unifying concepts and processes: systems, order, and organization; and evidence, models, and explanation.

NCTE National Council of Teachers of English
NCTM National Council of Teachers of Mathematics

NSES National Science Education Standards
NCSS National Council for the Social Studies

Brain Development

Lisa, age two and one-half, examined her doll with a toy stethoscope after returning from a visit to the pediatrician. This simple act of play revealed the growing power of her mind. A one-year-old is still much like a baby, just learning to make sense of the world. However, Lisa has learned so much by two and one-half that she can engage in imaginative play. She is using her imagination when she imitates the actions of her doctor or a character in her favorite book. In doing so, she develops her own ideas and extends her investigation of the world.

Most researchers agree that the brain plays a major part in directing behavior and determining intelligence. However, the exact functions of the brain were unknown until recent years. For a long time, people could do little but observe human behavior and guess about exactly how the brain controlled human actions and abilities.

Cells from the nervous system, called neurons, were observed to have fibers radiating from them, called axons and dendrites. As you learned in Chapter 9, these fibers were found to conduct information to and from other neurons in the brain. Later, scientists discovered that connections between axons and dendrites formed pathways in the brain that controlled particular actions or thinking tasks.

Since then, neuroscience has provided further important discoveries and insights about the functions of the human brain. **Neuroscience** is the modern study of the brain. These discoveries have greatly expanded the knowledge of how a child's brain develops. This knowledge has had an impact on recommendations for care of children.

People used to think that providing a child with food, clothing, and shelter in a loving, healthy, and safe environment was all a child needed for the development. Neuroscience has shown that a child's experiences can help determine the physical structure of the brain and the



Brain Development and Coordination
 Connections in the brain control actions and thinking tasks. Why can a three-year-old perform more tasks than a one-year-old?

extent to which a child reaches his or her potential. A parent can help ensure a child reaches his or her potential by offering a stimulating environment.

The Role of Intelligence

Intelligence is the ability to interpret and understand everyday situations and to use prior experiences when faced with new situations or problems. Intelligence is also the capacity to learn. Both heredity and environment shape intelligence. Everyone is born with certain limits of possible intellectual development. However, the extent to which a person's potential is actually developed is greatly influenced by that person's environment.

It is crucial for young children to have an environment that promotes learning and stimulates the senses. Such an environment includes interactions with caregivers and other children, a variety of appropriate toys, and plenty of encouragement. An enriched learning environ-

ment provides the best opportunity for learning. In fact, recent studies of brain development show that connections are made and the brain grows in complexity based partly on the opportunities for learning available to a child. A stimulating environment boosts learning. Children need bright colors and fun activities to learn.

Toddlers and preschoolers form attitudes about learning that can last a lifetime. If they are given many opportunities for learning, they are likely to develop a positive attitude toward learning.

Concept Development

Concepts are general categories of objects and information. Children learn concepts and the words for those concepts in stages. It takes time for misconceptions that result from a toddler's broad generalizations to be sorted out. Young children often over-apply labels. For example, toddlers may think that any round fruit is an orange. Young children gradually

learn to categorize objects by shape, color, and size. Balls are round, and so are cookies and disks. Grass and leaves are both green. Size distinctions come in two steps. The relationship between two items as big and little may be recognized as early as eighteen months. Not until age three, however, can children pick out the middle-sized ball from three possibilities.

Concepts concerning what is alive and what is not alive are not learned until later. A young child believes that anything that moves or works is alive. This includes clouds, toys, cartoon characters, and the washing machine!

Concepts of time improve during the second and third years. Two-year-olds may show more patience because they know what soon means and can wait a short time. They know the difference between before and after. However, a child may not understand today, tomorrow, and yesterday until kindergarten.

Reading Check Recall What are concepts?

Methods of Learning

Children learn much from everyday experiences and play. There are four methods that children use for learning. These include incidental, trial-and-error, imitation, and directed learning.

Recall that Jean Piaget divided learning into four distinct periods, as shown in **Figure 12.1** on page 356. Between the ages of one and three years, toddlers progress from the sensorimotor period to the preoperational period. As you read about the four methods of learning, think about how they might fit into Piaget's periods of learning.

Incidental Learning

Incidental learning is unplanned learning. For example, five-month-old Evan pushes a button on a musical toy and discovers that this action causes music to play. After this happens a few times, Evan learns a cause-and-effect situation. Then he pushes the button on purpose to hear the music.

Science in Action

Video Games and Brain Development

Research studies have reported findings that playing video games may damage developing brains. These studies are primarily concerned with whether or not video games slow or prevent the maturing of specific brain regions.

Procedure

Conduct research to learn more about one of these studies. Also research whether any scientists think that these findings are incorrect.

Analysis

Study the results of your research. Draw a conclusion concerning whether you think that video games can damage developing brains. Write a report explaining your conclusion and how you reached it.

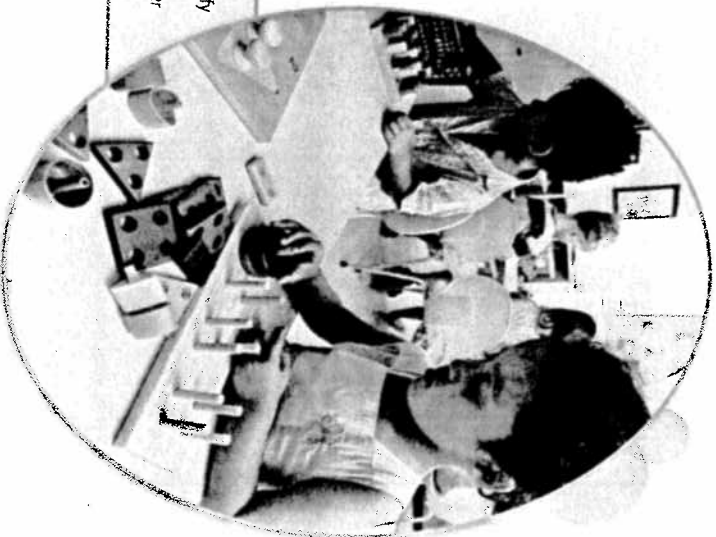
NES 1 Develop an understanding of science unifying concepts and processes.

Trial-and-Error Learning

Trial-and-error learning is learning that takes place when a child tries several solutions to find one that works. At about twelve to eighteen months, this means experimenting. Trial-and-error learning may be more advanced for a three-year-old.

For example, three-year-old Krista wants to play with her younger brother's toy robot. First, Krista grabs the robot from her brother. He screams, and their mother makes her give it back. Next, Krista tells her brother to go play in the sandbox, but he does not want to. Finally, Krista offers to let her brother play with her stuffed horse if she can play with his toy. He agrees to the trade, and Krista gets what she wants. She has learned the best way to get what she wants from her brother by trying ways that did not work.

Object Classification
By age three, many children can classify items by size, shape, or color. What is an example of a misconception a toddler might have?



Attention

At any given moment, the five senses are bombarded with information. Right now, for instance, you see the words on the page. You are aware of the size, shape, and color of the book and the amount of light in the room. You hear pages being turned, and perhaps you see other students jotting down notes. You feel the paper of the book. It is smooth and cool. If you were unable to screen out all of the extra information you take in, you would not be able to read.

In order to function, adults must be able to focus their attention on the task at hand. This means blocking out much of the sensory information they receive. Infants and young children are unable to do this. Their attention goes from one bit of sensory information to another as they try to make sense of it all. This is why toddlers are so easily distracted.

A caregiver may be struggling to dress a toddler. She may find that while she turned to get the shirt, the child wandered away to see what was going on outside the window. It is important for caregivers to understand how difficult it is for a child to pay attention to one thing at a time.

As children mature, they gradually build the ability to ignore most sensory information and to concentrate on one item of interest. Their learning becomes more focused on one topic or activity at a time. One- to three-year-olds tend to have very short attention spans. However, a three-year-old can focus on one activity for much longer than a one-year-old. The more children are able to block out distractions, the more they can learn. Caregivers may notice this as children spend more time interested in a story.

Memory

Without memory, there would be no learning. Experiences that are forgotten cannot affect later actions or thoughts.

Older children and adults have both short- and long-term memory. Short-term memory is brief and allows people to accomplish many everyday tasks without making the brain store

unimportant information indefinitely. People use short-term memory when they look up a number in the phone book. They remember the number just long enough to place their call. They will look up the same number the next time they need to call it. Long-term memory is for more important data. First, this information must enter the short-term memory and be judged important enough to remember. Then it is stored in the long-term memory.

Babies begin to demonstrate memory early. They quickly learn to recognize the faces of their primary caregivers, for example. Much of babies' memory abilities have to do with faces and foods. Between six months and a year, babies develop recall memory. This is the ability to remember more information for longer periods of time. This is especially true for things that had a strong emotional impact. For example, by this time Kylee can remember that she did not like cats because one scratched her.

or attitude to the child. Joel's kindergarten teacher helps him learn the letters of the alphabet by showing pictures of items that begin with each letter. At home, his sister demonstrates how to play Go Fish with playing cards. Joel learns how to play soccer from his coach. Directed learning begins in the early years and continues throughout life.

Reading Check Compare

How is directed learning different from imitation?

Intellectual Activity Areas

Intellectual activity can be broken down into seven areas. These are attention, memory, perception, reasoning, imagination, creativity, and curiosity. These areas develop throughout life, but their development from ages one to three is especially remarkable. As you read more about each area, try to think of ways that caregivers can encourage development in that area. Some basic intellectual milestones for these ages are described in Figure 12.2 on page 359.

Imitation

Imitation is learning by watching and copying others. Older children are often annoyed when a younger sibling copies everything they do or say. The younger child uses the older as a model for behavior of all kinds. Both skills and attitudes can be learned by imitation. Toddlers also carefully watch and mimic the actions and attitudes of their parents and caregivers. Have you ever seen a toddler talking on a toy phone? He is imitating the action of the adults around him. The best way to teach children to eat their vegetables or say please and thank you is to do these things yourself.

Directed Learning

Learning that results from being taught, often by parents, other caregivers, teachers, or older siblings, is **directed learning**. Directed learning occurs in school or other places that offer formal instruction, as well as at home. Unlike incidental learning or trial-and-error learning, directed learning involves an older person purposely teaching a specific skill, fact,

Figure 12.1 Piaget's Four Periods of Learning

Piaget's four periods of learning begin at birth and continue to adulthood. At what age does a child begin thinking in terms of what they perceive at the moment?

Period	Characteristics
Sensorimotor Birth-2 years	Children learn through their senses and own actions.
Preoperational 2-7 years	Children think in terms of their own activities and what they perceive at the moment.
Concrete Operations 7-11 years	Children can think logically but still learn best through experience.
Formal Operations 11-Adult	People are capable of abstract thinking.

Long-Term Memory

Long-term memory is the ability to remember an event in one's life for a long time. It depends on connections between neurons in two brain areas called the frontal lobe and the hippocampus. Research has shown that these parts of the brain are not able to form long-term memories until a baby is 17 to 21 months old. Even if a baby is too young to remember a story or a song, interactions with adults keep the child alert and interested. These interactions also aid brain development.

Science Inquiry Children do not have long-term memory until at least 17 months. What must take place in the brain before long-term memory can occur?

As children develop, they become able to react to a situation by remembering similar experiences in the past. A one-year-old who was frightened by a dog may be afraid of all animals for a time. A three-year-old can remember the specific dog and compare it with others. A three-year-old also can recall a celebration and look forward to the next one.

Learning Through PLAY

Memory Games

As a toddler's intellectual abilities grow, so do the possibilities for play. A three-year-old is able to use his or her memory to play games. Do you remember playing card games where the object was to place cards face down, turn over one card, and then turn over another to find its match? Three-year-olds are able to successfully play such a memory game for two reasons. They are able to keep an idea in mind for longer periods of time than when they were younger. They also can complete a task without being easily distracted. Simple

Children develop more long-term memories at age three. This is when they can retain facts such as "the girl next door is named Keisha." They can remember observations such as "I love to go to the park." They can also recall their own personal history such as "I got a new puppy last year."

Perception

A newborn learns about the world through perceptions. Perception is the information received through the senses. This sensory information reinforces established connections in the brain. It also sparks new connections. Although a newborn's brain is developing these neural connections and pathways at a rapid rate, the infant is just starting to interpret the information. Gradually, the brain organizes itself to handle increasingly complex learning as a child grows. This allows sensory information to be used more effectively.

If you care for young children, you can play a key role in the development of perception. By talking about what you and the children are doing, you encourage children's perception. Use descriptive observations that children can understand and expand on. For example, when playing with blocks, you might say, "Look at the

puzzles can be good for developing memory as well. Increasing a child's memory can help with later development of skills such as reading and writing.

Think About It Imagine you are babysitting a three-year-old. You bring along a memory game. The game involves matching 20 pairs of different animals. The child is having problems matching the cards. What might you do to make the game more appropriate for her age?

Figure 12.2 Intellectual Developmental Milestones—Ages 1–3

Toddlers reach certain milestones every year. What change occurs in the ability to follow directions between ages 2 and 3?

Age	Developmental Milestone
1 Year	<ul style="list-style-type: none"> ✦ Begins to put two words together ✦ Names common objects and people ✦ Understands "no," but ignores it ✦ Finds hidden objects
2 Years	<ul style="list-style-type: none"> ✦ Uses two- to three-word sentences ✦ Knows about 500 words ✦ Follows simple directions ✦ Identifies colors
3 Years	<ul style="list-style-type: none"> ✦ Uses longer sentences ✦ Knows about 900 words ✦ Follows two-part directions ✦ Sorts by color and shape



blue block. Your shirt is blue, too. Let's build a tower using only blue blocks."

Two- and three-year-olds seem to ask questions constantly. "Why?" "What's that?" "How does it work?" Responding to these questions helps improve a child's perception. It can be hard for caregivers to answer these endless questions. However, when questions are ignored or dismissed a child loses opportunities for learning. If the response is often an absent-minded "Uh-huh" or "Don't bother me right now; I'm busy," the child may stop asking questions.

Reasoning

Reasoning is necessary to solve problems and make decisions. It is also important in recognizing relationships and forming concepts. Babies show the signs of simple problem-solving skills at about four to six months of age. One-, two-, and three-year-olds gradually learn

more sophisticated reasoning skills. At fourteen months, Jason solves problems by trying out all possible solutions. When playing with a shape sorter box, he tries to fit each piece into each hole until one works. By his third birthday, Jason's problem solving is less physical and more mental. He can think through possible solutions and eliminate those that will not work without actually acting out each one. He can see that the square shape will fit in the square hole, and not the round one.

Making decisions involves choosing from different alternatives. Children learn to make good decisions through practice. This is why it is important to give young children plenty of opportunities to make real decisions. At first, these decisions should be choosing between two options in which neither choice could cause any harm. For example, an eighteen-month-old can choose between two books to read at bedtime. A two-year-old child can choose between two different shirts.

What Would You Do?

Learning About Differences

Three-year-old Zack was curious about his surroundings, especially about other people. He was not at all shy, and his mother was happy that he so often smiled and greeted people. One day, Zack and his mother went grocery shopping. "What's wrong with her?" Zack asked loudly. "Why is she walking like that?" Zack's mother drew him into a nearby aisle, and after a quick review of the use of inside and outside voices, she assured him that there was nothing wrong with the person he had seen. She was using crutches to help her walk because her legs might not work the way that Zack's do. On their way home, she reminded Zack that all people are different. She told Zack that it might hurt people's feelings when he asks personal questions too loudly.

Write About It Suppose your child tells you that some children at the child care center are teasing a child who must wear a hearing aid. Write a scenario in which you describe how you would respond to this situation. In your scenario, state exactly what you would say to your child.

Parents of newly independent two-year-olds know that this approach has the added advantage of avoiding questions that may elicit, or bring about, a negative response. For example, a child could easily say no to the question, "Would you like to have fish for dinner?" A better question is, "Do you want beans or corn with your fish?" What kinds of decision-making opportunities might be appropriate to offer to a three-year-old?

Imagination

Imagination becomes very apparent at about two years of age. An active imagination improves learning because it allows the child to try new things. The child also can act out a variety of roles. Laundry baskets become airplanes, boxes are buildings, and closets are caves. The child becomes a ferocious lion or a busy airline pilot.

Children use their imagination to connect what they see and hear with themselves. For example, Yvonne may see an airplane. Then she imagines that she is an airplane, and zooms around the backyard with her arms outstretched. Imagination can also help children cope with anxiety and frightening new concepts. For instance, some children may pretend

Imagination

Children often use their imaginations to try out new ideas and roles. Why should you not tell a toddler he is lying when he uses his imagination?

to throw a scary monster out the bedroom window as a way of managing their fear. Using a toy doctor's kit and pretending to be a doctor can help calm fears about an upcoming medical procedure.

It is important to respect a child's imagination and respond carefully. When three-year-old Kim makes up a story, she is not lying. She is using her imagination. However, suppose Kim's mother says, "Don't be silly. You know that didn't really happen." Kim might be discouraged from using her imagination again. In fact, until about the age of five, children are not always sure where reality ends and imagination begins.

Creativity

An ability that is related to imagination is creativity. Creativity is a mental ability that involves using the imagination to produce original ideas. These ideas are often displayed

through an object that others can see, such as a drawing or finger painting. The creative product is not always an object, though. It might be daydreams, dramatic play, or silly stories. Creativity is most readily developed in early childhood and is an asset throughout life. Creativity helps promote self-esteem and confidence.

Parenting Skills

Encourage Imagination and Creativity

While some children may naturally be more imaginative than others, all children need opportunities for creative play. Here are some ways to support a child's creativity:

- ➔ **Encourage exploration.** Promote activities that depend on exploration and imagination. Examples include drawing, dressing up in grown-up clothes, and telling stories.
- ➔ **Provide multipurpose toys.** Children need toys that can be used in more than one way. Wooden blocks can become cars, doll beds, or castle walls.
- ➔ **Allow for unstructured time.** Children need uninterrupted time to themselves. The less television they watch, the more their imaginations will grow.
- ➔ **Resist the inner critic.** Remember that the process of creating is more important than the product. There is more than one right way to paint or mold things from clay.
- ➔ **Reward the young creator.** Praise the child's efforts with both deeds and words. Display the child's pictures. Talk with others about what the child has made.

Take Charge Many caregivers worry about the mess resulting from creative play. Write a paragraph explaining what you might do to reduce the mess.



There are many ways that parents can encourage creativity. One of the most important and simple ways is just to allow the child free time, or unstructured play. Many people think of toys when they think of play. However, in previous years, children were more likely to play at make-believe. Whether indoors or outside, children can make up their own rules and games. This is a great, inexpensive way to build creativity.

Curiosity

Children are curious about the world around them, and that curiosity helps brain development and learning. It is curiosity that makes children wonder why and how about things. Curiosity makes children try new activities. However, parents may sometimes stifle, or suppress, that curiosity by overprotecting a child. Although children need a safe environment, they also need the freedom to explore the world around them.

Most young children seem to get into everything. They peek into every corner and closet. They touch and examine everything within reach. They like to climb just to see what is out of sight. It is often impossible to anticipate what a one-, two-, or three-year-old may do next. A doll may end up covered in bandages because "she fell down."

Toddlers are especially curious about the activities of their parents and caregivers. They might take the phone away from their dad to find out why he is talking to an object instead of to them. Remember that a toddler is still very self-centered. Anything that takes your attention away from them will raise their curiosity to find out why.

Parents should encourage a child's curiosity whenever possible. A child should not be allowed to do something that will harm him, like climb a bookshelf. However, if the child wants to stop during a walk to watch a snail, it is stimulating his brain development.

Section 12.1

After You Read

Review Key Concepts

1. Explain why it is vital that young children have a stimulating learning environment.
2. Describe how trial-and-error learning supports Piaget's description of the sensorimotor period.
3. Identify why curiosity is important.

Practice Academic Skills

English Language Arts

4. Write four test questions describing situations in which a child is learning something. In each question, ask the person taking the test to identify the learning method (incidental, trial-and-error, imitation, or directed). Switch questions with classmates and take their tests.

Mathematics

5. Interview 20 of your classmates. Ask: What is your earliest memory as a child? How old were you when this event occurred? Calculate the average age of all the students at the time of their earliest memory.

Check Your Answers Check your answers at this book's Online Learning Center at glencoe.com.

NCTE 5 Use different writing process elements to communicate effectively.

NCTM Data Analysis and Probability Select and use appropriate statistical methods to analyze data.

Section 12.2

Reading guide

Encouraging Learning from One to Three

Before You Read

Predict Predicting what you will learn can help focus your attention. Write down what you think might be covered under "Reading Readiness" in this section. Then read the section. Was your prediction accurate?

Read to Learn

Key Concepts

- List 11 ways to help guide a child's learning.
- Identify four parts of language that children have an inborn ability to decipher.
- Summarize how to evaluate toys for young children.

Main Idea

Children need to have certain skills before they are ready to read or learn basic math concepts. During this time, their language skills grow rapidly. Toys play an important developmental role.

Content Vocabulary

- ◇ reading readiness
- ◇ math readiness
- ◇ articulation
- ◇ stuttering

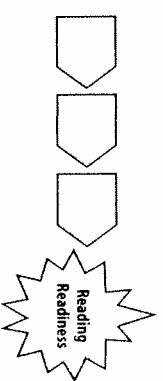
Academic Vocabulary

You will find these words in your reading and on your tests. Use the glossary to look up their definitions if necessary.

- unstructured
- decipher

Graphic Organizer

As you read, look for ways in which reading aloud to children prepares them to be ready to learn to read. Use a chart like the one shown to help organize your information.



Graphic Organizer Go to this book's Online Learning Center at glencoe.com to print out this graphic organizer.

Academic Standards

English Language Arts

NCTE 12 Use language to accomplish individual purposes.

Science

NSES A Develop abilities necessary to do scientific inquiry, understandings about scientific inquiry.

Social Studies

NCSS 1A Culture Analyze and explain the ways groups, societies, and cultures address human needs and concerns.

NCTE National Council of Teachers of English
NCTM National Council of Teachers of Mathematics

NSES National Science Education Standards
NCSS National Council for the Social Studies

Readiness for Learning

Learning begins very early in life. However, children can learn a new skill only when they are physically and intellectually ready. For example, it would be a waste of time trying to teach a six-month-old to put on a coat. The baby has neither the physical nor intellectual maturity that the skill requires. Most two-year-olds lack the fine motor skills and conceptual development necessary to learn to write letters and words.

Sometimes adults push children to learn things they are not ready for. When children are not able to succeed, they may feel frustrated or feel they are a failure. These feelings may become stumbling blocks for learning. It is important to remember that children learn and grow at different rates. Therefore, worries such as "Brad is not talking as early as Mackenzie" should be minimized.

On the other hand, children should be taught skills they are ready to learn. For example, two-year-old Ben struggled with dressing himself. His mother helped by dressing him every day. She found out later that her helping was causing

problems. When Ben was well past the age when he should be able to dress himself, he continued to ask for help. He had not developed enough confidence to complete the task on his own.

Most importantly, children need plenty of time for undirected play and safe exploration. As children explore their environment and everything in it, they will naturally make many discoveries.

Reading Readiness

A child's readiness to read depends in large part on the environment caregivers create. Enjoying books is vital for learning to read. The act of being read to should be a well-established, daily routine and a special time together. Even very brief sessions of reading to infants can be helpful in developing a joy of reading.

Interact with young children while reading to them. Let the children point at the pages and comment. Ask them to predict what will happen next. The more enthusiastic the reader is, the more enthusiastic children will become about story time.



Learn New Skills

Children are ready to learn different skills at different times. *What skills do children usually learn before they walk?*



Reading Readiness

Reading to a young child can help them develop reading readiness skills. *How is reading to the child helpful?*

Reading readiness means learning the skills necessary for reading, including letter recognition and the understanding that letters of the alphabet combine to form words on a page. Before age three, reading readiness focuses on children's excitement about reading. The bedtime story accomplishes more than many parents realize.

- Children learn how to handle books and turn pages.
- They begin to associate written words that appear on the page with words being read aloud.
- Finishing a book creates a sense of accomplishment, especially when the child can choose what to read next.

The next stage of reading readiness involves letter recognition. This includes the understanding that letters of the alphabet combine to form words. Some children are ready to recognize letters at age three. During reading time, you can encourage the child to say the letters they see on the page. You might respond,

"You're right! That's a B. Your name begins with a B. B for Brianna!"

Children's readiness to read on their own may vary widely. Do not expect a strict timetable for gaining the preliminary skills needed for reading. It is more important that children learn to enjoy the process.

Expert Advice...

"The kind of care a child receives plays a big role in how the brain chooses to wire itself. Parents who talk and read to their babies are helping them develop important language connections."

— Dr. Diane Bales, at-risk children, youth, and families coordinator, University of Georgia

What Would You Do?

Learning by Helping

Three-year-old Molly was excited when she woke up. Liz was taking care of her today! When Liz arrived that morning, Molly asked to have pancakes for breakfast. "I'll help you," said Molly confidently. While Liz got out the pancake mix, Molly watched. "How many cups of mix do we use, Molly?" asked Liz. "Two!" said Molly. "You put it in a bowl!"

"That's right. Let's use the big blue bowl today!" Molly got out the bowl and handed it to Liz. "Thank you," said Liz. "Now I'll measure the mix." Liz filled a measuring cup and let Molly level the cup with a spatula and put the mix in the blue bowl. Liz asked, "How many eggs?" "One!" "Right again!" Liz smiled at her helper. Liz measured the milk and Molly stirred it in to the mix herself. Molly liked to count the pancakes in the pan as Liz cooked them. Molly also commented that the pancakes were the same color as the kitchen floor—brown!

Write About It Think of a task you perform frequently, such as making your bed or feeding a pet. Write a scenario in which you and a three-year-old perform the task together. Include what you would say and do to help the child learn during this activity.

Math Readiness

Math is a part of everyday life. People may count out a dozen apples, measure ingredients from a recipe, or count out coins. People use math so often and so unconsciously, they may miss experiences they could share with young children. **Math readiness** is the level of knowledge of basic math concepts, such as number recognition, needed for learning math. It also involves an interest in learning basic math concepts. As with reading, math can become a welcome and pleasant part of everyday experiences. Children can explore sizes, shapes, amounts, and proportions long before they ever enter a classroom.

To teach numbers, you can talk to children as they go about their daily routine. "Are there two bananas left this morning, or only one?" "How many plates are set out for dinner?" Counting and number recognition can be taught by making a game of finding numbers. How quickly can a child find a "3" on the signs in the grocery store?

Blocks and puzzles can teach shape recognition. They also help in learning the shape names. Sorting is a good mathematics skill. You can work with children to sort blocks and other items by shape, color, and size.

Guiding Learning

There are many ways to help guide children's learning. As you read the suggestions, try to remember a time when someone helped improve your learning in this way:

- **Give your time and attention.** Children learn best when a caring person pays attention to them and encourages them.
- **Allow time for thinking.** Solving problems and making decisions are new experiences for young children. They need time to consider choices and make decisions.
- **Give only as much help as the child needs.** If a toddler is struggling to put on a shirt, do not take over. Just help slip the shirt over the child's head before it gets caught. Children feel a sense of accomplishment when they do things on their own. Try to let children do the final step in any task they are struggling with.
- **Encourage children to draw their own conclusions.** "Let's find out" is better than an explanation. Seeing and doing helps reinforce learning and allows for discoveries that prompt further curiosity.
- **Demonstrate how to solve problems.** When a toddler's tower of blocks keeps falling down, demonstrate that stacking one block directly on top of another provides the balance. Then leave building the tower to the toddler.
- **Model problem solving.** Talk out loud as you solve everyday problems. This allows children to hear how you think your way to a solution.

- **Maintain a positive attitude.** Express confidence in the child's abilities. One way to praise the child's efforts. "Thank you for helping me plant the daisies. You did a great job!" You can also point out improvements in a specific action, such as coloring. **Keep explanations simple and on the child's level.** Too much information can cause a young child to stop listening. When a child asks about why fish live in water, an appropriate explanation might be, "Fish breathe in water. People need air to breathe."

- **Allow children to explore and discover.** Exploration is often a messy business. It is important to give children opportunities to roll in the grass, splash in puddles, and squeeze mud through their fingers and toes. Safety is important, but constantly saying "Don't do this" and "Don't touch that" limits the sensory and motor experiences that promote learning.

- **Help children understand the world and how it works.** Take young children along, even on routine errands. On trips to the library, the supermarket, and the gas station, you could talk about what is happening and why it is happening. Helping out at home also boosts learning. While raking leaves together, for example, you might call attention to the different colors and the cracking sounds of the dried leaves.
- **Take frequent breaks.** Children need stimulation. They also need opportunities for unstructured play. Unstructured means lacking formal organization. Watch for clear signals that a child has had enough of an activity. Fussing, wiggling in a chair, or looking distracted suggest that it is time to move on.

Reading Check Analyze Why is it important that children be allowed to explore and discover on their own?



Exploration and Discovery

Children learn by being able to explore on their own. What might a child learn by playing in the mud?

Language Abilities

In the toddler and preschool years, language abilities grow at a very rapid pace. As with other areas of development, children's speech varies greatly. Brain development research has brought new insights into how children learn to use language. Children have an inborn ability to decipher, or interpret, sounds, words, sentences, and grammar from the language they hear. Most children develop language skills in the first three years of life.

Speech Development

Infants learn to recognize the speech of their parents and other caregivers early in life. Soon after, infants begin practicing the sounds of speech by babbling. Beginning at around twelve months of age, babbling gradually transforms into a child's first words.

Between their first and second birthdays, children work at learning new words. They like to learn the names of everything. They also enjoy listening to the sounds the words make. At this point, rhyming books that tell stories are ideal. At twelve months of age, a child may speak two to eight words, but by age two, that jumps to about 50 words. During this period, most children use one or two words rather than a whole sentence to express

a thought. For example, Chloe points to a jar on the counter and says "cookie" to mean "I want a cookie."

Encourage language development by talking to young children about their lives. Speak clearly about children's everyday experiences. For example, take the time to describe whatever they are seeing or doing. "Look at the big bite you've taken out of that yellow banana. Does it taste sweet and yummy?"

At about age two, children usually start combining a few words to make short sentences, such as "Doggie bark" or "Jimmy fall down." Between ages one and two, a child typically calls himself or herself by name. At about two years of age, children begin to use pronouns, such as I, we, you, and they.

At about two and a half, children begin to learn some basic grammar rules. They learn by listening to other people talk, rather than by any formal teaching. For example, a child begins to add an s to words to make them plural. The child then applies this rule to all words. Feet and toots make as much sense to them as hands and eyes.

Language skills continue to develop, but at varying rates. Most three-year-olds can:

- Say their name and age.
- Make all the vowel sounds and say the consonants P, B, M, W, H, D, T, and N.

Model Language

Children's language development is influenced by how adults around them speak. Why is it important to use good grammar when speaking to a child?



CULTURE MATTERS

Preschool in France

In France, nearly every child attends preschool, which is free of charge. It costs the French government about \$3,300 per child per year. These schools bring together children from a variety of communities and encourage social development. They also prepare children for further education.

French preschools are staffed with highly trained teachers. The French government pays for teachers' education, and the government inspects each school every year. Preschool teachers in France earn salaries equal to those of elementary school teachers. In comparison, preschool teachers in the United States usually earn about two-thirds as much as elementary school teachers.

Build Connections What do the relative salaries of teachers in France and in the United States tell you about preschool education in these two countries?

NCSIA Culture Analyze and explain the ways groups, societies, and cultures address human needs and concerns.



- Speak without repeating a word or syllable.
- Use sentences of at least four words.
- Usually be understood by others, even by strangers.
- Answer what and where questions.
- Understand what is meant by words such as *on*, *in*, and *under*.
- Follow a command with several parts.

Speech Difficulties

Parents become concerned when they believe their child is a late talker. Some make the mistake of pressuring the child. This pressure just makes the child aware of the problem, and possibly makes it worse.

A child who does not seem to understand what is said, does not speak at all, or speaks very little should have a thorough examination. Local public school districts often provide free screenings by a speech-language pathologist. A speech-language pathologist is a specialist who is trained to detect and help correct speech problems. Speech difficulties can often be treated

beginning at age three or earlier. It is important to identify any physical problem that may be interfering with a child's language development as early as possible. Hearing problems, learning disabilities, and mood disorders may all hinder a child's speech development.

Children with speech difficulties need to be lovingly encouraged, but not pressured. Such an attitude can help the child cope with, and perhaps even overcome, the problem. Teasing or constant corrections only make the problem worse. Children need to know they are loved, regardless of any learning difficulties.

Articulation

The term **articulation** refers to the ability to use clear, distinct speech. It is normal for children to have trouble with articulation until at least age three or four. Some children skip syllables or leave off the endings of words. These problems usually correct themselves over time. A speech-language pathologist can determine whether a problem is likely to go away on its own or if speech therapy is needed.

SAFE CHILD HEALTHY CHILD

Basic Toy Safety

Everyone involved in a child's life should make sure all toys are safe. Here are some safe toy guidelines:

- Any fabric should be labeled flame resistant or flame retardant.
- Paint must be lead-free.
- Crayons, paints, and other art materials should be labeled nontoxic.
- Toys should not be able to break into sharp pieces.
- For younger children:
 - Toys should not have long cords or strings that could wrap around a child's neck.
 - Toys and rattles should not be able to get lodged in a child's mouth.
 - Objects should be over 1.75 inches in diameter to avoid choking hazards.
- **Be Prepared** Spend about a half hour examining the toys of a child under age four. If you need help finding a child, ask your parent or teacher for help. Check each toy for safety. Write a summary of what you find. Tell the child's parents if you find any toys you feel are unsafe.

he hit Zoe!" This is not true stuttering. In this case, the child's speaking and thinking abilities are still immature. It is difficult to get the words out quickly and smoothly.

True stuttering can be identified by the rhythm, pitch, and speed of speech. It is rapid, forced, short, and sharp in sound. Usually, the child repeats only the beginning sound of a word: "T-c-c-c—can't g-g—g—go outside."

The child often also shows tension in some way, such as gasping, sputtering, or rapid blinking.

The cause or causes of stuttering are still not completely understood. Some children overcome the problem with speech therapy. However, most children who stutter outgrow it. Experts advise against finishing words for a child. Children who stutter need time to say the words on their own.

Reading Check Recall What are three things that might interfere with a child's speech development?

Play Activities and Toys

Toys are an important part of play. They help children explore, imagine, and try out different roles. They encourage the development of motor skills and help children learn to share and cooperate with others, making further learning easier and more fun.

Stimulating Play Activities

Often a child's favorite toy is really a caregiver. A caregiver can respond instantly and individually to the child's efforts at play and imagination. A toy cannot respond in the same way. Some adults do not like to get on the floor and play with children. However, such interaction can expand the child's learning. At the same time, the parent or caregiver can learn more about the child's interests and talents.

Evaluating Toys

With thousands of toys to choose from, knowing what to buy is important. Parents should ask themselves these questions:

- **Is the toy safe?** This is the single most important consideration. Make sure there are no small parts that could be swallowed

or sharp edges that could cut. Be aware that a toy that is safe for a three-year-old may not be safe for a one-year-old. Also make sure the toy is not flammable and indicates nontoxic when appropriate. The federal government's Consumer Products Safety Commission alerts the public about unsafe toys.

- **Is it well-made and durable?** There is nothing more discouraging for a child or an adult than having a toy break the first time it is played with. Can the toy withstand the rough treatment it will receive?
- **Will it be easy to care for?** A well-loved stuffed animal needs to be washable. Similarly, books with hard pages and wipe-clean covers are the most practical choice for toddlers.

• **Does it encourage the use of a child's imagination?** Some toys do everything for the child. With no need to pretend, the child's imagination develops more slowly. Look for simple toys that can be used in a variety of ways. A talking doll may say ten phrases, but a child can make an ordinary doll say anything!

- **Is it colorful?** Young children respond more readily to colorful objects. These toys also encourage children to learn the names of colors.
- **Will it be easy for the child to handle?** Think about the size of the toy and its level of difficulty. The excitement of receiving a motorized car is quickly lost if the child is too young to use it on her own.
- **Is it something the child will enjoy?** A toy that a child finds engaging is much better than a toy forced upon him by a well-intentioned parent or relative.

Age-Appropriate Toys

Toys should be appropriate for a child's age. Infant toys are usually not challenging enough for three-year-olds. An older child's toys are not able to hold the attention of most fourteen-month-olds. Children at different ages enjoy and learn from different kinds of toys. The following are some suggestions for age-appropriate toys.



Appropriate Toys

Toys should be safe, age-appropriate, and enjoyable for a child. How would you rate the toy in the photo based on the questions in this section?

One to Two Years

At this age, a child practices motor control and learns through exploration. Some favorite toys are household items, such as metal pans, wooden spoons, and plastic storage bins. Pull toys, floating bath toys, toys that make music, and sorting toys are also popular.

Most toys that allow the child to use large muscles are also good choices. These toys may include swings, riding toys, balls, and cardboard boxes. One-year-olds also enjoy stuffed animals, sturdy books, simple puzzles, and toy cars. Avoid toys with parts that are small enough to fit into the cardboard tube from a roll of toilet paper.

Two to Three Years

Coordination and understanding improve greatly during this year. In addition, the child wants to do what adults are doing. The desire

to imitate and role play provides ideas for many toys. Good choices are a child-size vacuum cleaner or lawn mower, telephone, plastic or wooden tools, play dishes, and empty food containers. Crayons, play dough, books, and large blocks are popular. A sandbox with a toy bucket and shovel can provide hours of enjoyment.

Three to Four Years

Preschoolers' improved motor skills and increased imagination bring interest in more complex toys. These often use fine motor skills. Dolls to dress, construction sets, and similar toys are popular. Three-year-olds love to mold play dough, color, cut with blunt scissors, and paint. Three-year-olds also spend longer periods with books than younger children. They enjoy listening to music. They like to do puzzles and use swings and slides. Many three-year-olds love to ride a tricycle.

Section 12.2

After You Read

Review Key Concepts

1. Describe one of the principles for guiding a child's learning and give an example of a caregiver putting it into practice.
2. Identify two kinds of speech difficulties that might indicate that speech therapy is needed.
3. List at least four toys that are appropriate and fun for toddlers between the ages of one and two.

Practice Academic Skills

English Language Arts

4. Suppose you are applying for a summer job at a local preschool. You have heard that this preschool emphasizes reading readiness. Write a letter to the school's director explaining ways in which you would encourage reading readiness in young children.

Science

5. Most researchers believe that genetic, neurological, and social factors all play a role in stuttering. Conduct research to learn more about how these factors are related to stuttering. Write a one-page report to share what you learn.

Check Your Answers Check your answers at this book's Online Learning Center at glen.coe.com.

NOTE 12 Use language to accomplish individual purposes.

WESA Develop abilities necessary to do scientific inquiry, understandings about scientific inquiry.

Chapter 12 Review and Applications

Chapter Summary

Intelligence is determined by both heredity and environment. Children learn concepts and the words for those concepts in stages. Learning methods include incidental, trial-and-error, imitation, and directed learning. There are seven areas of intellectual activity. Children's learning can be guided by adults. Caregivers should encourage reading and math readiness during play and everyday activities. Toys should be safe, appealing, and appropriate to a child's age. Speech difficulties include problems with articulation and stuttering.

Vocabulary Review

1. Write each of the vocabulary terms on an index card, and the definitions on separate cards. Work in pairs or small groups to match each term to its definition.

Content Vocabulary

- ◇ neuroscience (p. 353)
- ◇ intelligence (p. 354)
- ◇ incidental learning (p. 355)
- ◇ trial-and-error learning (p. 355)
- ◇ imitation (p. 356)
- ◇ directed learning (p. 356)

Academic Vocabulary

- elicit (p. 360)
- stifle (p. 362)
- unstructured (p. 367)
- decipher (p. 368)

Review Key Concepts

2. Summarize how heredity and the environment shape intelligence.
3. Describe the four methods of learning used by young children.
4. List the seven areas of intellectual activity.
5. List 11 ways to help guide a child's learning.
6. Identify four parts of language that children have an inborn ability to decipher.
7. Summarize how to evaluate toys for young children.

Critical Thinking

8. Evaluate Recall a toy you enjoyed playing with as a child. Evaluate the benefits of that toy for young children.
9. Apply Suppose you are visiting a mother. Her toddler is feeding himself spaghetti. The mother gets upset at the mess. What might you say?
10. Judge Some people argue that in order to create an equal society, preschool must be free to all children. Do you agree? Explain your answer.

