

# 3

## What Children Learn

*The Creative Curriculum* organizational structure's third component is content—what preschool children learn. Experts have developed standards defining what children should know and be able to do by certain grade levels. States and local school districts have adapted these standards. The content children learn in *The Creative Curriculum* is guided by these standards.

Preschool teachers have always taught content. When they made recipe cards so children could count the cups of flour needed to make a cake, they were teaching math. When they challenged children to find out what kinds of leaves a caterpillar liked to eat, they were teaching science.

Today, because of the standards movement, the knowledge base in each content area is more systematic. Also, the emphasis on teaching content is greater than in the recent past. These changes have set a new challenge for the preschool teacher—knowing what to teach and how to present it. *The Creative Curriculum* explains how to teach content in ways that respect the developmental stages of preschool children. This chapter defines the body of knowledge included in each content area and the process skills children use to learn that content.

**Literacy**—vocabulary and language, phonological awareness, letters, words, print, comprehension, books, and other texts

**Mathematics**—numbers, patterns and relationships, geometry and spatial awareness, measurement, and data collection, organization, and representation

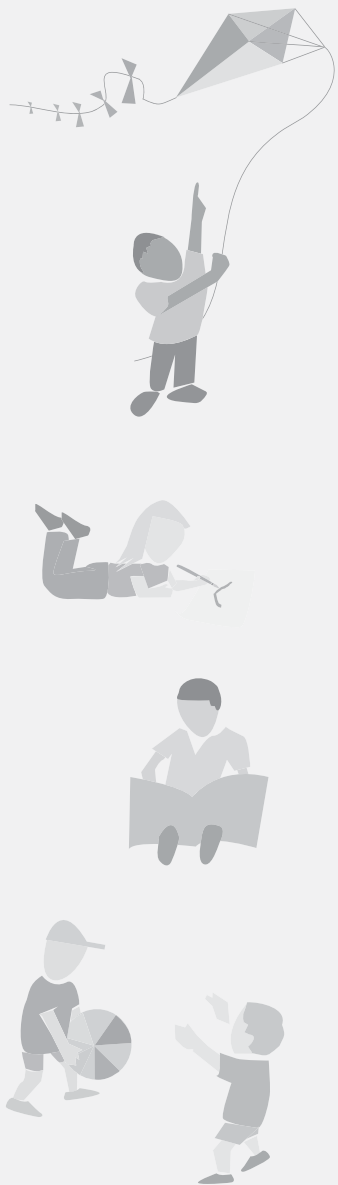
**Science**—the physical properties of objects, living things, and the earth and the environment

**Social Studies**—how people live, work, get along with others, shape, and are shaped by their surroundings

**The Arts**—dance, music, dramatic play, drawing and painting

**Technology**—tools and their basic operations and uses

**Process Skills**—observing and exploring; problem solving; and connecting, organizing, communicating, and representing information



# Literacy

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Becoming literate doesn't just happen. Teachers thoughtfully and purposefully interact with children and plan experiences that support emerging literacy. A print-rich environment that allows children to practice literacy skills in real-life experiences, combined with explicit teaching of key concepts, is the foundation of literacy learning in preschool. As children's excitement about their newfound ability to read and write increases, teachers create multiple opportunities for continued literacy learning.

## Components of Literacy

Over the past few years, researchers and practitioners (Snow, Burns, & Griffin, 1998; National Institute of Child Health and Human Development, 2000) have studied how children learn to read, write, and understand written language. They have identified what concepts children need to become competent and confident readers and writers and the kinds of experiences that help them make progress. Based on this research, we describe seven components of literacy for preschool children ages 3–5:

- increased vocabulary and language
- phonological awareness
- knowledge of print
- letters and words
- comprehension
- understanding books and other texts
- literacy as a source of enjoyment

### Increased Vocabulary and Language

When children are exposed to rich vocabulary, they learn the words they will need to read and write. In addition, research has shown that children who have large vocabularies and lots of experience using language are more successful in school (Hart & Risley, 1995). A *Creative Curriculum* classroom provides many opportunities for children to develop vocabulary and use language. These include

- informal conversations—talking with peers and adults throughout the day
- songs, rhymes, fingerplays, or movement activities
- firsthand experiences—hearing new words to describe what they are doing
- read alouds—listening to books and talking about new words in the story

### **Preschool children demonstrate increased vocabulary and language when they**

- point to one of the trucks and say, “That’s a frontloader.”
- share at group time: “I’m going fishing with my dad tomorrow and we’re going to bring fishing poles and a big net and catch 100 fish.”
- describe a scary dream as a “nightmare” after the teacher reads *There’s a Nightmare in My Closet*.

If you have children whose primary language is not English, you should know that a strong base in a first language promotes school achievement in a second language (Snow et al., 1998). Children who are learning English as a second language are more likely to become readers and writers of English if they understand the vocabulary and concepts in their primary language first. These children need special attention to increase their vocabulary and language abilities. The long-term goal is for children to be able to understand, speak, read, and write in both the primary language and English. Therefore, you want to support children’s first language as you help them acquire oral proficiency in English.

### **Phonological Awareness**

Phonological awareness is hearing and understanding the different sounds of spoken language. It includes the different ways oral language can be broken down into individual parts, for instance, separate sounds and syllables. A key finding in recent research has been the importance of developing phonological awareness during the preschool years.

The skills that make up phonological awareness lie on a continuum of complexity. The simplest level of phonological awareness includes skills such as playing with rhymes, noticing how words begin with the same sounds, or clapping out individual words or syllables of a song, rhyme, or chant. Playing with sounds in speech paves the way to phonemic awareness—the most advanced level of phonological awareness. Phonemic awareness is the ability to hear, identify, and manipulate the individual sounds—phonemes—in spoken words (National Institute of Child Health and Human Development, 2000). Phonemic awareness typically is addressed in kindergarten and first grade.

It is common to confuse phonological awareness with phonics, but they are not the same. Phonics is connecting a printed symbol with a sound, unlike phonological awareness, which is hearing sounds. Phonics activities become appropriate for preschool children only if they understand that speech is made up of a sequence of sounds. The preschool teacher’s role in promoting phonological awareness is to draw children’s attention to the separate sounds of spoken language through playful songs, games, and rhymes.

Children learning English as a second language are also developing phonological awareness through the activities you do. They may not reproduce sounds exactly as they are made in English, however. These children are still learning to hear and discriminate the sounds of English and need you to acknowledge (rather than correct) the sounds they are trying to make while you continue to model correct English pronunciation.

### **Preschool children demonstrate phonological awareness when they**

- join in saying rhymes, poems, and rhyming songs
- make up nonsense words or silly names (e.g., “Silly Willy,” “funny bunny”)
- clap along with each word or syllable of a song or rhyme (e.g., clapping twice while saying the name Kel-ly)
- notice that several words or names begin with the same sound (e.g., Jonelle, Juwan, Jonetta)

### **Knowledge of Print**

This component of literacy involves connecting print with meaning. Children acquire a knowledge of print by seeing it in the environment and using it in their play. By drawing children’s attention to the features of print, you help children to develop print concepts such as the following:

- Print carries a message.
- Each spoken word can be written down and read.
- Print follows conventions (e.g., left to right, capital/lowercase letters, punctuation).
- Books have common characteristics (e.g., front, back, author, illustrator).

### **Preschool children demonstrate knowledge of print concepts when they**

- point to a printed label and say, “Cars go here.”
- make a grocery list in the Dramatic Play Area, writing the words from left to right and top to bottom
- read a big book to a group of stuffed animals, pointing at the words and turning the pages from front to back

## Mathematics

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Just as preschool teachers cultivate literacy in children, they use multiple opportunities during the day to help child build competence in math. When children give each person at the table a cracker, pour water from one container to another, put all the big buttons in one pile and the smaller ones in another, or clap a rhythmic pattern—they are learning math. Everyday experiences such as these provide the context for preschool children to progress in math. In addition, teachers' knowledge of the substance of math content provides facts and concepts needed to promote and extend children's mathematical thinking.

### Components of Mathematics

National standards in mathematics (NCTM, 2000) describe what children should learn in preschool. The key components of math include

- number concepts
- patterns and relationships
- geometry and spatial sense
- measurement
- data collection, organization, and representation

#### Number Concepts

Number concepts are the foundation of mathematics. These concepts develop gradually over time as children explore, manipulate, and organize materials and as they communicate their mathematical thinking with adults and peers.

Children are said to have number sense when they have a good intuition about numbers and their relationships. As children gain a sense of numbers, they understand, for example, what “three” really means, and that “threeness” can be represented by a number “3,” the word “three,” or a set of three objects. They begin to explore the relationships between quantities such as more, less, and the same.

**Counting** is one of the earliest number concepts to emerge. It begins with the development of oral counting skills or rote counting sometimes as early as age 2. Rote counting simply means memorization of a sequence of numbers. Rote-counting skills develop as children join in songs, fingerplays, and rhymes involving numbers.

**One-to-one correspondence** follows rote counting. One-to-one correspondence means linking one, and only one, number with each item in a set of objects. This technique should be modeled throughout the day in interest areas and daily routines, and often must be taught directly. Sometimes children count an object twice. You can model strategies to help children keep track of what they are counting by showing them how to move each object to the side after they have counted it.

**Other number concepts include quantity, comparisons, and number symbols.**

Quantity is the concept of an entire set (knowing that the last object counted represents the entire set of objects). If you ask a child to bring you three cookies and he brings you all three rather than just the third cookie counted, he probably has an understanding of quantity. A child who understands number order knows whether he counts a row of three cookies from left to right or goes in a different order, the amount is still three. Making comparisons involves knowing the meaning of such terms as *more than*, *bigger than*, *less than*, and *the same as*.

Young children can learn the names of numbers without having any idea what the symbol represents. The concept of number symbols involves seeing a numeral, for instance 3, and associating that numeral with three objects. Number symbols only have meaning when they are introduced as labels for quantities. Rather than teaching children to recognize number symbols in isolation, link the number symbols to a quantity.

**Preschool children demonstrate understanding of number concepts when they**

- notice that it takes five scoops of sand to fill a cup
- predict it will take 10 blocks to make a fence, then count to see if the prediction is correct
- count five children and then set the table with five plates, napkins, and forks

# Science

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Science content is more than isolated facts such as the stages in the life of a butterfly. Scientific facts are important, but how they are put together into meaningful ideas is more significant. For example, learning about the development of a butterfly should lead to the big idea that all living things develop in a series of stages called a life cycle. Preschool children learn science by exploring the world around them. When you provide an environment with many varied materials, they try out things to see how they work, they experiment, they manipulate, they are curious, and they ask questions. As they seek answers to their questions, they learn to enjoy and appreciate their surroundings. These activities are science.

## Components of Science

To decide which concepts children should learn, observe children's scientific interests and what they see and do every day. Your observations will fall into three categories that are the components of science (National Research Council, 1996):

- physical science
- life science
- earth and the environment

### Physical Science

Physical science is about the physical properties of materials and objects. Through exploration of materials, children learn about weight, shape, size, color, and temperature. They explore how things move and change. When children make a block ramp to race cars, look through a kaleidoscope, or pick up objects with magnets, they are learning about the physical properties of objects. Think about these questions to help children learn physical science:

What does this look like? Big or little, striped or polka dotted, bright or dull?

How does this smell? Like perfume or burned like toast?

How does this taste? Sweet, salty, bitter, or bland?

How does this sound? Loud or soft, fast or slow?

How does this feel? Slimy, squishy, hard, sharp, or tickly?

How can you make this move? Can you roll it, twist it, blow it, swing it, or push it?

How can you make this change? Can you mix it, pour it, smash it, or shake it?



It is not necessary to set up specific science experiments for children. You can create opportunities to learn about physical science in all interest areas.

**As you talk with children, they can demonstrate their understanding of physical science when they**

- use a magnet to pick up metal objects buried in the sand table
- tilt ramps to make cars go down faster in the block area
- use a pulley to lift a basket of books into the reading loft
- say, “Look! My blue paint ran into the yellow paint and it turned green.”

 **Life Science**

Life science is about living things. You are teaching life science when you ask children to care for plants and animals in a classroom. Key ideas emerge from exploring the immediate environment. Therefore a preschool in Louisiana might explore crawfish, while in Alaska children might learn about salmon or caribou. In Arizona, children could learn about cactus and in rural Nebraska, about corn. No matter what topic children study, these are the concepts to think about as you plan learning experiences:



How do living things get food?

What are characteristics of plants and animals?

What do plants and animals need to grow?

How do plants and animals depend on each other?

How do living things change as they grow?

Which animals lay eggs?

What plants and animals live in our neighborhood?

Life science also includes knowledge about one’s body and how to keep it healthy. These topics can be taught by exploring these big ideas:

How do your bodies grow and change?

How do you use your senses to make discoveries?

Why do you need different kinds of food?

How do you stay safe and healthy?

**Preschool children demonstrate their knowledge of life science when they**

- point out, “Our gerbil sleeps all day long. I wonder if he stays awake at night?”
- water plants after observing that their leaves are drooping
- notice that their hearts beat faster after running on the playground

 **Earth and the Environment**

The component of science called earth and the environment is about the world of nature. In preschool, earth and the environment are about natural settings that children can experience directly. The goal is for children to understand those settings, learn key ideas, and develop respect for their natural surroundings. Think about how you might address these questions in your daily activities:



What is the land like in this community? Is there water, grass, sand, or rocks? Are there lakes, ponds, mountains, deserts, rivers, or fields? What are these things like?

What can you see in the sky? How do the things in the sky affect the world around you?

What is the weather like here? How does it affect you?

How can you take care of the world around you?

**Preschoolers learn about the earth and the environment when they**

- play shadow tag
- talk about things they do during the day and at night
- add water to dirt while making mud pies
- paint with water on the sidewalk and notice that the picture soon disappears

**Connecting  
Science Content,  
Teaching, and  
Learning**

The content of science in *The Creative Curriculum* is geared to children’s interest in the world around them. The chart that follows shows how to connect science content, teaching, and learning. The first column shows the general content of science for preschool. The second column shows some of the many ways teachers might present this content effectively. The last column lists the objectives on the *Developmental Continuum* you should be watching for as children work on science content. As you watch children engage in these activities, you will be able to observe and identify children’s developmental progress. This information will help you to determine the kinds of science content to present and the methods to use.

## Social Studies

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Social studies is the study of people—how people live today and how they lived in the past, how they work, get along with others, solve problems, shape and are shaped by their surroundings. Children begin learning social studies in infancy. They explore physical space by crawling, climbing, digging, and splashing. In preschool, board games or the challenge of riding around a tricycle path teach mapping skills. Children learn about time (history) from the daily predictable routines you establish—a story before rest time, circle time after interest areas, and outdoor play after lunch. When you set up a play grocery store and help children learn about jobs and buying and selling, you help them learn economics. This learning continues as they visit the supermarket, the doctor, the hardware store, and the shoe store. Preschoolers learn about civics as you teach them to cooperate to resolve differences in a classroom setting. Everyday experiences pertinent to children’s lives are the foundation for learning social studies.

### Components of Social Studies

Social studies standards focus on history, geography, economics, and civics. We have organized the components of social studies for preschool children into the following categories:

- spaces and geography
- people and how they live
- people and the environment
- people and the past

#### Spaces and Geography

Geography for preschool children includes the characteristics of the place where they live, and the relationships between that place and other places. It also includes the physical characteristics of the children’s world and mapping. The materials for teaching this content area are the slides, the swings, and the grassy area by the tree—and the method is talking about how to navigate these areas. You can talk about mapping by discussing directions—how to get to the bathroom, the playground, the carpool line. You can encourage children to recreate their neighborhood in the Block Area and draw or paint maps of places they go. An important goal is for children to begin to understand that maps represent actual places.

These kinds of questions can help you think about ways to build understanding of spaces and geography:



Where do you live? What is your community like?

How do people move from one place to another?

Where are you in relation to other people and objects (e.g., near, far, next to, outside, behind)?

What is a map and how can it help us?

**Preschool children demonstrate their understanding of spaces and geography when they**

- move a piece in the right direction while playing board games like *Candyland*
- mold wet sand to make mountains, hills, and streams
- figure out how to maneuver around a bike path or an obstacle course
- use blocks to represent roads and buildings



**People and How They Live**

People and how they live is the component of social studies that includes physical characteristics of people; similarities and differences in habits, homes, and work; family structures and roles; and the exchange of goods and services. Preschool children can begin to explore these concepts by studying themselves and their families and by thinking how classroom rules help people live together and get along.

These questions about people and how they live may help you design experiences for children to learn these ideas:



Who are the people in your family? What do they do?

How do you make and keep a friend?

What are the jobs of people in our community?

How do people use money to get goods and services?

What are some of the rules in your home, school, and community?

**Preschool children demonstrate their growing understanding of people and how they live when they**

- talk about family members living in the same house
- describe what jobs their parents do
- point out that their hair color is the same as a friend's
- use a toy cash register to "sell" shoes
- invite a child in a wheelchair to play catch with a ball

 **People and the Environment**

People and the environment covers the ways people change the environment and protect it. For preschool children topics in this component of social studies are, for example, building cities, making roads, building highways or dams, cleaning up a park, recycling, or preserving some green space. In preschool the method for teaching people and the environment is to draw out what children learn by exploring the area around their home and school and to build on that information.

Here are some questions you can think about to help children explore about how people affect the environment:



How can we respect and care for our world?

What are some bad things that people do to the environment? How do they affect all of us?

**Preschool children demonstrate their understanding of people and the environment when they**

- place trash in the wastebasket in the classroom and the playground
- note, "If they cut the tree down on our playground, we won't have any shade."
- help collect trash from the playground

## The Arts

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Art is designing, creating, and exploring. Children mix paints; pound and shape clay; build structures with blocks, boxes, and Legos; dance; dramatize stories; clap rhythms; and sing chants and songs. Preschool children like to get their hands into materials and to move their bodies. Preschool teachers can expose children to a wide variety of experiences in the arts throughout the day.

### Components of the Arts

National Standards for Arts Education (Consortium of National Arts Education Associations, 1994) includes four components:

- dance
- music
- theater or performing arts (what we would call dramatic play in preschool)
- visual arts

You will find that these four components of the arts are emphasized throughout *The Creative Curriculum*. Chapter 9 on Art provides guidance on the visual arts. Chapter 13 on Music and Movement describes appropriate experiences in music and dance. Throughout the entire Curriculum, emphasis is placed on the important role of symbolic and pretend play. Components of the drama standards can be found in the Dramatic Play Area, the Block Area, the Library Area, and the Music and Movement Area. In addition, group time activities provide opportunities for dramatizations. A discussion of how the standards in the Arts apply to preschool follows.

#### Dance

Dance is using one's body to express ideas, to respond to music, and to convey feelings. When you encourage children to vary their responses to different musical phrases, they learn about the body's ability to move, and they use time and space in many different ways.

#### **Preschool children demonstrate knowledge of dance when they**

- use scarves and streamers to move to the music
- imitate movements of animals after a trip to the farm
- move quickly to a polka, and slowly to a lullaby or spiritual

## Music

Music is combining voice and/or instruments to create melodies and pleasing sounds. Children learn music by listening to and interacting with many kinds of sounds. Therefore, you should provide children with opportunities to play with musical instruments, learn and make up songs, listen to recordings, and talk about sounds. When preschool children explore instruments, create melodies, learn songs as a group, and make up songs, they develop appreciation for different kinds of music and become comfortable with different forms of musical expression.

### Preschool children demonstrate their understanding of music concepts when they

- make different sounds with musical instruments
- play musical games such as “Farmer in the Dell” and “Hokey Pokey”
- create a song while pounding clay
- say, “That music makes me think of a parade.”

## Drama

Drama is telling stories through action, dialogue, or both. Preschool children recognize that movement can communicate messages and represent actions. Preschool teachers are teaching drama when they provide children with clothing they can use to dress up and pretend, props that can transform blocks into a city, and puppets that can act out a story. As children play with materials such as these, they express their feelings and inhabit and learn about worlds beyond the limits of their immediate surroundings.

Drama also has a direct impact on other learning, such as language development and literacy. In *Preventing Reading Difficulties in Young Children* (Snow et al., 1998) the writers report that children benefit from play-based instruction in which they invent dramatic play scenarios. This kind of sociodramatic play not only increases oral language use and enables children to practice storytelling skills, but it also offers a challenge for children to work together to negotiate their play ideas. In turn, each of these skills promotes reading comprehension.

**Preschool children demonstrate drama skills as they**

- gather props and act out “Goldilocks and the Three Bears” in the dramatic play area
- pantomime someone who is happy, sad, angry, tired, excited, and scared
- make up a puppet show for others to watch
- ask, “Guess who I am?” and then pretend to walk like an elephant

**Visual Arts**

The visual arts are painting, drawing, making collages, modeling and sculpting with clay or other materials, building, making puppets, weaving and stitching, and printmaking with stamps, blocks, or rubbings. Children benefit from opportunities to work with different kinds of paint and paper; draw with crayons, markers, and chalk; put things together with paste and glue; cut with scissors; mold playdough; and clean up with mops, sponges, and brooms. The more exposure you give children to all kinds of materials—and to discussions about different ways to use the materials—the more children become able to express their ideas through the visual arts.

The visual arts also promote an understanding of the world. Children learn to draw and draw to learn. Using markers, clay, collage, wire, or wood, children represent what they have learned about a topic. In so doing, they master drawing materials and learn about different perspectives, part/whole relationships, size, position, and the characteristics of people and things.

**Preschool children demonstrate understanding of the visual arts when they**

- create a torn-paper collage after looking at books illustrated by Leo Lionni
- use bright paint colors at the easel
- try different ways to balance a mobile
- create a get-well card for a friend

**Connecting  
Content in the  
Arts, Teaching,  
and Learning**

In a *Creative Curriculum* classroom, the arts are addressed throughout the day. The chart on the next page shows how to connect the arts content, teaching, and learning. The first column outlines the content of the arts for preschool. The second column shows some of the many ways teachers can provide learning experiences for children. The last column lists the objectives on the *Developmental Continuum* you should be watching for as children work on arts content. As children engage in these activities, you will be able to observe and identify children’s developmental progress. This information will help you to determine the kinds of experiences to offer and the ways to offer them.

# Technology

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Technology is the study of tools, machines, materials, techniques, and sources of power that make work easier and that solve problems. Children learn technology by exploring how things work. When they figure out what kind of tools they need to build a structure using wood scraps they are solving technological problems. When children sing songs into a tape recorder or create colored lines on the screen by dragging a mouse, they are using tools. If you view technology from a broad perspective, you can see how it can be integrated into all aspects of the preschool classroom.

For children with disabilities, the use of technology opens new avenues for learning. A child who is unable to speak can use communication devices to interact with others. A child who is physically impaired can use switches to control battery-operated toys. Special assistive devices allow children with a handicapping condition to have equal access to the learning environment.

## Components of Technology

Standards in technology (International Society for Technology Education, 1998) outline the skills, concepts, knowledge, and attitudes that children in preschool through grade 12 should demonstrate. The standards focus on both the basics of using computers and the uses of technology to communicate, to learn new information, to solve problems, and to create. Equally important, the standards also stress social skills, such as working cooperatively with peers and using technology responsibly.

We have identified four components of the technology standards that apply to preschool children:

- awareness of technology
- basic operations and concepts
- technology tools
- people and technology

### **Awareness of Technology**

For preschool children technology is knowing how technology is used at home, at school, and at family members' work sites. You can teach technology by asking children to name the tools and machines they use every day and to think about how tasks might be accomplished if this equipment were not available. You also can encourage children to find out how people use technology to do their jobs.

#### **Preschool children demonstrate an increasing awareness of technology when they**

- pretend to scan merchandise while playing store
- notice how computers are used during a field trip to the fire station
- suggest making a video of their trip to the grocery store

### **Basic Operations and Concepts**

This component of technology includes the basics of using technological tools. For example, if children are using tape recorders, they need to know how to insert a tape, turn the machine on and off, and use the play and rewind buttons. The basics of using computers are turning on the computer, starting up a program, navigating through software, and exiting the program. The Computer chapter describes in detail how to introduce children to computers and how to interact with children so they can acquire knowledge and concepts about this technology.

#### **Preschool children demonstrate knowledge of basic operations and concepts when they**

- use a mouse, keyboard, or touch screen to operate the computer
- use a drawing program to create a picture
- rewind a tape they have listened to so another child can hear it from the beginning

## Process Skills

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When children learn content in literacy, math, science, social studies, the arts, and technology, they are learning more than facts. They are learning methods of communicating, thinking mathematically, doing what scientists do, conducting social science research, creating as artists, and using technology. Methods of learning are called process skills.

Children use process skills as they work on learning concepts in each of the content areas covered in *The Creative Curriculum*. The cognitive and language objectives in the *Developmental Continuum* include process skills that have been described in many standards documents. Below we provide an overview of process skills and show how they apply to the content areas described on the previous pages. We also pinpoint which *Developmental Continuum* objectives relate to each process skill.

**Observing and exploring.** Observing and exploring involves noticing things in the environment and noticing how and when they change. These process skills also include manipulating objects to understand their properties and how they work. As an example, a child notices that a car goes down a ramp faster if the ramp is tilted and then explores tilting it at different angles (Science).

*Creative Curriculum* objectives related to observing and exploring include

- 22. *Observes objects and events with curiosity*
- 24. *Shows persistence in approaching tasks*
- 42. *Asks questions*

**Connecting.** Connecting involves linking new learning to prior experience. Connecting anchors new learning and puts it into a broad context. For instance, a child talks about bedtime routines after hearing the story, *Bedtime for Frances* (Literacy).

The *Creative Curriculum* objective related to connecting is

- 26. *Applies knowledge or experience to a new context*