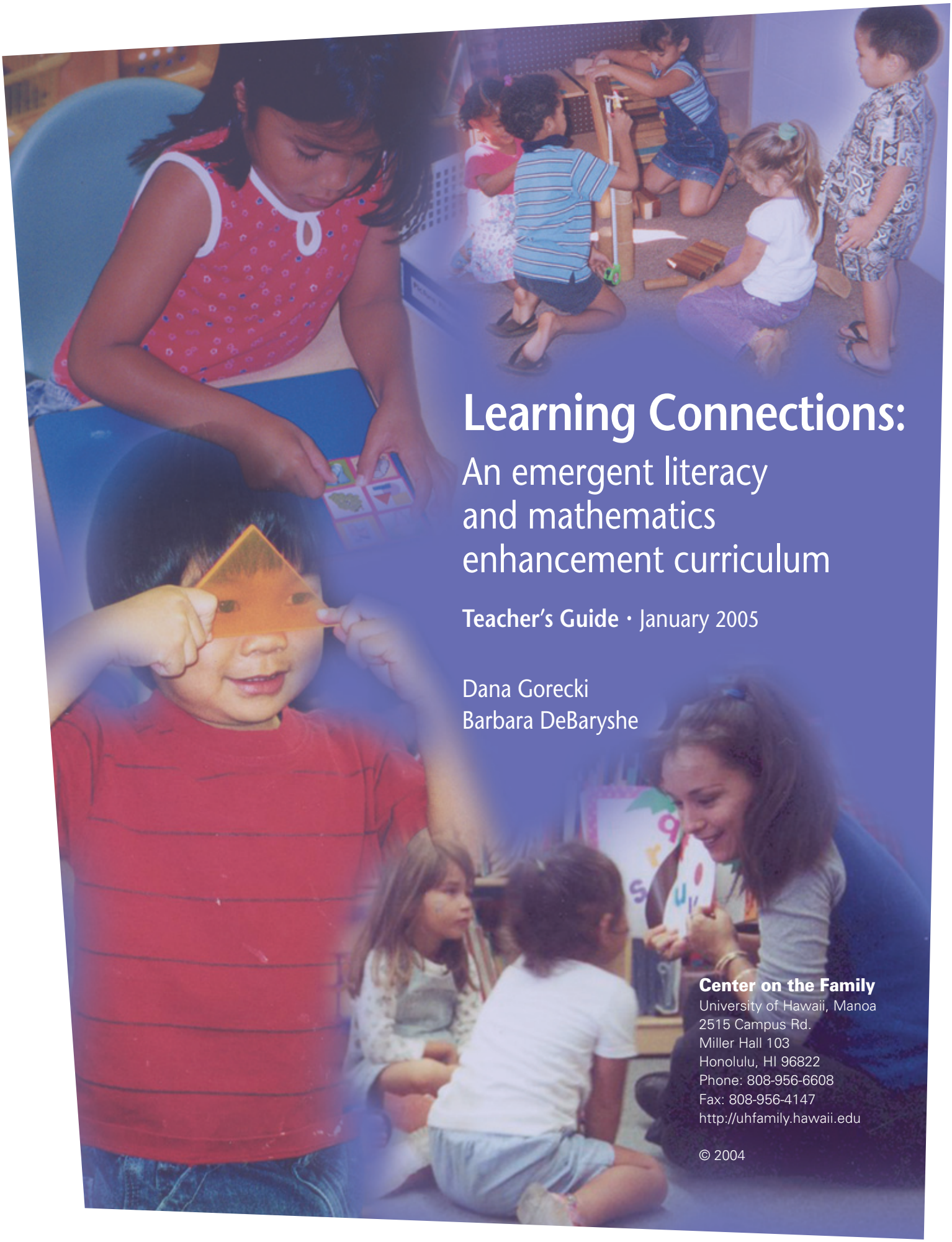

Learning Connections:

An emergent literacy and mathematics enhancement curriculum

Teacher's Guide · January 2005

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Introduction

WHY LEARNING CONNECTIONS?

Learning Connections is a supplemental curriculum for use in multi-age preschool classrooms. The curriculum is designed to promote school readiness and later academic success by providing an enriched focus on emergent literacy and emergent mathematics. Although Learning Connections was developed and field-tested in a Head Start setting, we believe the curriculum is applicable in preschools of all types. Distinctive features of the curriculum include:

- A solid foundation in theory and research. The learning goals and developmental sequencing of activities come directly from current research in early childhood development and education.

- Learning activities that are developmentally sequenced and individualized to meet the needs of diverse learners. Activities vary from fundamental to advanced, and enough variety is included to engage and challenge preschoolers at all skill levels.

- Learning goals that have both a current and a future focus. The skills addressed in the curriculum are both developmentally appropriate and provide children with the conceptual foundations of the higher-level academic skills they will encounter later on in school.

- Inclusion of parents as full and necessary partners in their children's education. A family curriculum that parallels the classroom curriculum, ensuring that what children learn at school is also learned and practiced at home in the context of daily family routines.

- An emphasis on mentoring and supporting teachers through a combination of formal in-service training and more informal in-class mentoring.

- Articulation with national and state educational standards. Learning Connections is consistent with practice recommendations of the National Association for the Education of Young Children, the International Reading Association, and the National Council on the Teaching of Mathematics. Learning Connections is fully articulated with the Head Start Program Performance Standards, the Head Start Child Outcomes Framework, the Hawai'i Preschool Content Standards, the Hawai'i Content and Performance Standards for kindergarten, and the PTSA standards for parent involvement.

- Sensitivity to the needs of multicultural learners, with an emphasis on Asian and Pacific Islander children and families. Learning Connections was developed in Hawai'i, a locale that is noted for cultural diversity. Curriculum materials include vocabulary, themes, illustrations, and objects that reflect this diversity.

THEORETICAL FOUNDATIONS

All good teaching is rooted in theory, which gives teachers the reasons for doing what they do. But no single theory completely captures the complexity and wonder of early learning. In developing Learning Connections, we blended three major theories from the fields of child development and early childhood education.

Information Processing Theory

Information processing theory is one of the newest theories that describe thinking, reasoning, and learning (Brown, Bransford, Ferrara & Campione, 1982; Case, 1998). It focuses on the internal processes involved in remembering, comparing, reasoning, problem-solving, and thinking creatively. Key concepts in the information processing model include *attention and memory capacity*, the *knowledge base*, *effortful vs. automatic processing*, and *metacognition*. Most current research on literacy and mathematics is based on an information processing approach. Yet this theory is often given scant attention in early childhood teacher training.

One important difference between young children and older children and adults is the child's *memory size and attention capacity*. Preschoolers find it hard to avoid distracting information and focus only on what is relevant to the task. For example, if asked to group animals according to whether they have hoofs or paws, a child may inefficiently start to pay attention to other things such as whether or not the animal had horns. Preschoolers also have a hard time using multiple pieces of information at the same time. They may say that an eight ounce glass holds more water than a 12 ounce bowl, considering only that the glass is taller, and neglecting to also realize that the glass is slender while bowl is shallow but much wider. Finally, children have a somewhat smaller active memory space than adults. Preschoolers can keep about four pieces of information active at one time. If you are helping a child spell horse, you can't just say "H-O-R-S-E." The child has to remember the letter names, remember what each letter looks like, remember how to form each one with the pencil, where to place the word on the page, etc. The child's memory space is quickly overloaded and he or she rarely gets further than writing the first letter.

Compared to older children and adults, preschoolers had a simpler *knowledge base*. The knowledge base is a bank or store of experiences, factual knowledge, memories, learning strategies, and procedures for how to do things. More experienced and skillful learners have more information or experiences in their knowledge base. They also have more complex links between individual pieces of information, and multiple levels of organization that provide more sophisticated and flexible connections within the knowledge base. This allows the person to think and reason faster and with more insight and creativity. For example, a child who is very interested in animals may have an unusually large and complex base of knowledge relevant to living creatures. If shown a picture of a possum and told that "Possums are marsupials," he may correctly induce that possums have live births and carry their new babies in a pouch near their abdomen. He may also (incorrectly) infer that possums, like many other marsupials, live in Australia and like to eat eucalyptus leaves.

Practice and speed are a third important component. With practice, skills that were once effortful and taxing become smooth, effortless, and automatic. Think of a child just learning how to tie their shoes. At first, she struggles to remember each step in order, and fumbles with the laces, trying to shape the loops and knots. With practice, each step becomes easier and she no longer has to be reminded what to do next. With time, she can tie her shoes quickly and securely.

Finally, *metacognition*, or thinking about thinking, is the capacity to be self-aware about how one thinks and solves problems. Preschoolers have limited metacognition compared to older children. For example, a three-year-old may confidently claim that he can remember a whole page full of

different trucks, while a five-year-old would be more realistic. Metacognition helps a child self-regulate and control their learning. Preschoolers start to be aware that they need reminders to help them remember things. For example, a child might say, "Tonight I will put my Pokemon cards in my backpack, so I remember to bring them to school tomorrow." Children also start to realize that difficult tasks can be handled by breaking them up into smaller pieces. A child might say to her friends, "If we're gonna build a castle, first we have to think what we want the castle to have in it." A child who is just starting to sound out words shows his ability to judge his own thinking when he immediately discards a copy of *Charlotte's Web* as "too hard" to read, and reaches for a labeling book instead.

The value of many things you do as a teacher can be explained in terms of information processing theory. When you remove distracting materials from a child's work space, you help optimize their attentional capacity. When you take children on a field trip to learn about their community, you are expanding their knowledge base. When you provide free access to materials, you allow children to practice and automatize their skills. And when you ask children to explain their ideas, reasons, and answers you are helping them acquire metacognitive awareness.

Social Learning Theory

Social learning theory focuses on the links between the child's thinking, the child's behavior, and the child's immediate environment (Bandura, 1986). Key concepts in social learning theory include *reinforcement, observation learning*, and *motivation*.

Social learning theory stresses the importance of the child's physical and social environment. Children learn most quickly when they are exposed to repeated experiences and when tasks are broken down in to smaller, sequenced steps. Children's behavior is shaped via *reinforcement*. Children are sensitive to feedback about the success of their efforts and strive to act in ways that earn approval or success.

Children also learn through *observational learning*, or watching others. Watching and imitating other people is an important way to learn new skills. Children are most attentive to people who are caring, skilled, powerful, and important to them. Parents, teachers, best friends, older siblings and superheroes all fit this profile.

Social learning theory also *takes thoughts, intentions, and motivation* into consideration. Although children are seen as being shaped by their experiences, they are not passive recipients of rewards and punishments. Instead, the child very actively takes on his or her world by observing, acting, and experimenting. His or her actions contribute to learning and affect the people with whom the child interacts. Through this interaction children gradually learn new skills, and establish long-term attitudes about their capacity for success. Too many negative experiences may lead to learned helplessness or a general expectation that their actions will be unsuccessful, which causes the child to stop trying. On the other hand, frequent successes lead the child to expect that their efforts usually pay off; the child will take risks and be motivated to persist in the face of challenging situations.

As a teacher, you already act in ways that are consistent with social learning theory. You model new behaviors such as counting or print tracking. You provide supportive and corrective feedback that helps children master new skills. Through your warmth and enthusiasm, you motivate children to do their best and develop a positive mindset about learning.

Sociocultural theory

Sociocultural theorists believe that cognitive development is a social process, because no person can learn in isolation. All that we learn, we learn in the context of being with and interacting with other people. Key ideas from sociocultural theory include *joint productive activity, scaffolding, internalization*, and the *zone of proximal development* (Rogoff, 1998).

According to socioculutral theory, the source of all thinking, beliefs, values, and knowledge is *joint productive activity*, or doing things with other people. This could be anything from an academic task, to a playing a game, to having a conversation about what happened earlier in the day. What is important is that both participants gain some degree of agreement about what they are trying to do. For example, if a teacher is helping a child write a name label to post on his or her cubby, both participants share the idea that others can somehow read or understand the label and that it will inform people who the owner of the cubby contents is.

Sociocultural theory sees social interaction as crucial for learning. But it goes deeper than simply thinking of social interaction in terms of modeling and reinforcement. In teaching, the parent, adult, or other more skilled person works with the child on an activity or task. The more skilled learner helps the child participate by *scaffolding* the task, or providing support that helps the child do more than he or she could do alone. Scaffolding can include a wide variety of supports such as asking leading questions, sequencing materials, showing how to do the next step, or helping the child strategize or plan. Through scaffolding, the teacher opens up a *zone of proximal development*. Proximal means close. When the child is close to, but not yet at a higher level of skill, the teacher can provide just enough assistance to allow the child to succeed. Next time, the child may be able to take greater responsibility for the task. The teacher adjusts his or her scaffolding, giving less and less assistance until the child is performing more independently and at a higher level. The child gradually *internalizes*, or adopts as their own, the knowledge of how to do the activity and an understanding why this is an interesting or valuable thing to do.

Again, as a teacher, you already do many things that are consistent with sociocultural theory. This includes encouraging cooperative learning, joining in with children as they work and play, and the countless ways in which you provide suggestions, assistance, hints, and guidance as children engage in classroom experiences.

Putting it all together

In designing Learning Connections, we constantly referred to the three theories described above and the developmental research on literacy and math that is described in the following section. The features of the curriculum and how they are linked to information processing, social learning, and sociocultural theories are shown in the table below. As you become familiar with the Learning Connections classroom and family activities, you will see how these pieces fit together.

CURRICULUM FEATURE	SOURCE
Culturally relevant materials	Sociocultural theory
Small learning groups	Sociocultural theory
Activity content	Developmental research
Sequenced activities	Social learning theory, developmental research
Activity variations	Social learning theory, sociocultural theory, developmental research
Teacher modeling and explanations	Social learning theory
Teacher encouragement and praise	Social learning theory
Teacher asks children to predict and comment on problems	Information processing theory, social learning theory
Teacher provides assistance and suggestions as needed	Sociocultural theory

DEVELOPMENTAL FOUNDATIONS

There is much debate about how to approach instruction. On one hand, early childhood educators often favor a holistic approach to teaching. In this approach, learning tends to be more child centered and activities emphasize meaningfulness and sense-making. On the other hand, elementary educators tend to use a more basic skills approach to instruction. In this approach the many separate skills that are needed to master complex domains like reading or arithmetic are isolated and taught in sequence.

Fortunately, the answer to this debate is becoming clear. Children need *both* approaches. Instruction must address both meaningful use and component skills. Much of the fundamental understanding of literacy and math does emerge "naturally" as children are exposed to real-life situations involving language, signs, books, quantities, and comparisons. But some aspects of literacy and mathematics are not self-evident, and for almost all children, the learning of symbol systems (the alphabet and numerals) and their use requires guidance and practice.

Guidance, however, does not mean drill or worksheets. Teaching can be purposeful and sequenced, and still be engaging, hands-on, activity-based and vibrant. Strong teachers understanding the developmental foundations of literacy and mathematics learning. They have a good sense of the sequence, or order in which skills tend to emerge. This knowledge prepares them to expect and appreciate the wide range of skills and ways of understanding that different children express. This knowledge helps them break down the learning of complex skills into smaller, more manageable steps that make sense to children. Skilled teachers observe each child at play and during more structured activities and use this information to gauge where the child is in the learning sequence. This knowledge helps them individualize and adapt activities so that each child gets just the right amount of challenge—not too little which becomes boring, and not too much, which becomes overwhelming.

In the next sections, we review the developmental foundations of emergent literacy and emergent mathematics. This is the research base from which we developed the Learning Connections classroom and family activities.

Emergent Literacy

Becoming literate is a long-term process that begins in infancy as babies start to communicate with their caretakers and continues on into adulthood. Most children do not enter kindergarten being able to read and write in the formal sense. But most children do have an important understanding of what reading and writing can accomplish, they have at least partial knowledge of the alphabet, they love to write messages (that may or may not be readable by others), they enjoy listening to books, they play with language, and can give a fairly convincing "reading" of favorite stories. Many children use invented spelling, can recognize familiar printed words by sight, and are starting to sound out or decode short words. Some children are even reasonably fluent readers. There is, of course, great variation from child to child.

Preschool and kindergarten children with strong emergent literacy skills have an easier time learning to read than children with weaker emergent literacy skills. They also show consistent advantages in reading, writing, spelling, and general academic achievement throughout the school years. For this reason, it is important to provide all children, and especially at-risk children, with preschool experiences that give them a solid foundation for later learning.

What do preschool teachers need to focus on? After putting together the best research on early literacy and later learning, the major professional educational organizations agree that children need to develop skills in:

- Oral language
- Phonological and phonemic awareness
- Print awareness
- Alphabet knowledge
- Emergent writing (Neuman, Copple, and Bredekamp, 2000; Snow, Burns and Griffin, 1998)

The Learning Connections curriculum fosters each of these skills.

Oral Language

Listening and speaking are necessary foundations for literacy. In reading and writing, we translate spoken language into the symbol system of print. Speaking, reading, and writing are all forms of communication. Good communicators have a wealth of ideas and concepts, and use clearly stated sentences and a rich vocabulary to get their ideas across to others. Having a large vocabulary, being familiar with story structures, and sensitivity to grammar all help children understand what they read. After the first few years of elementary school, teaching methods become much less hands-on and children learn mostly from listening, talking, reading, and writing.

Preschoolers need to develop rich *vocabularies*, the ability to *listen and understand* what they hear, and practice *conversation* skills. The most powerful influence on language development is the way that adults (both parents and teachers) talk with children (Dickinson & Sprauge, 2001; Hart & Risley, 1995). Children benefit when you:

- engage them in frequent conversations in which you use and model a rich variety of words of sentences;
- prolong conversations by making comments and asking questions;
- ask interesting and challenging questions that help children think;
- encouraged children to express their ideas, comment on what is happening and ask questions; and
- respond to what children have to say.

Teacher-child conversations are most effective when they happen one-on-one or in small group settings. One of the best settings for promoting oral language development is reading aloud. Books introduce children to new worlds of ideas and words; the pictures help children understand what is being read, and the routine and closeness provide motivation and comfort. Reading aloud is especially helpful when adults engage children in active discussions of the books. In this technique, called *dialogic reading*, adults scaffold the discussion using leading questions and responsive conversational extenders, drawing children into longer and more complex participation in the read-aloud session. Dialogic reading has been used effectively by teachers and parents, and leads to lasting gains in children's expressive vocabulary size, and the grammatical and semantic complexity of speech (Hargrave & Sénechal, 2000; Whitehurst, Arnold, Epstein, Angell, Smith & Fischel, 1994; Whitehurst et al., 1988).

In Learning Connections, dialogic reading is one of the main activities used to promote language growth. You can also promote language development throughout the school day by using thoughtful conversations during free play, meal times, outdoor activities, transitions, and learning center activities. The same questions and comments that work so well during dialogic reading also work when no books are involved. Focus on the child's activities and interests as the center of your conversations.

Phonological and Phonemic Awareness

Most children speak and listen quite well before they start to be aware that spoken language can be broken up into smaller pieces. *Phonological awareness* is the understanding that spoken language is made up of smaller parts, for example, that conversation is made up of sentences, sentences are made up of words, and words can be divided into smaller parts like syllables. *Phonemic awareness* is part of phonological awareness, namely, the understanding that words are made up of individual phonemes or sounds.

Phonological and phonemic awareness skills usually appear in the following general sequence (Opitz, 2000):

SKILL	DEFINITION	EXAMPLE(S)
Word awareness	Knows that words are speech units that express meaning.	Child says "car, bike, dog" when asked to name some words. Child taps once for each word in the spoken sentence "I love you" when the teacher says it slowly.
Syllable awareness	Knows that words are made up of one or more parts, each part marked by a drop in the speaker's jaw.	Child claps once for each syllable in a word that is spoke slowly, e.g. "cat" (1 clap), to-ma-to" (3 claps).
Rhyme awareness	Knows when words end with the same set of sounds.	Recognizes that "cat," "hat," and "mat" sound the same at the end.
Onset-rime segmentation	Can divide a single syllable word into the initial sound or sound blend, and the final sound cluster.	Can say "cat" as "cuh-at" or divide "street" into "stu-reet".
Phoneme matching—alliteration	Recognizes or says words that start with the same first sound.	Knows that "man," "moon" and "Mighty Mouse" all start with the sound /m/.
Phoneme matching—final sounds	Recognizes or says words that end with the same last sound.	Child notices points to pictures of a car and a helicopter and says, "Both of these have /r/ at the end."
Phoneme blending	Puts sounds together to form a word.	If asked, what word is this, "st-reet", child answers, "street." Teacher asks "What does the dog love to eat? /b/ - /_/ - /n/" and the child answers, "Bone!"
Phoneme matching—middle sounds	Recognizes or says words with the same internal sounds.	When asked, "Which two sound the same inside" matches pictures of snow and toad.
Phoneme segmentation	Dividing a word into its separate sounds.	Can stretch the word "cat" into "/c/-/a/-/t/" Says "/m/-/a/-/n/' when asked, "What sounds are in man?"

Be careful not to confuse phonemic awareness with *phonics*. Phonemic awareness is a listening skill. Phonics, or decoding printed words by sounding them out, is a reading skill.

Many preschool children master rhyme and some forms of phoneme matching, but may continue to work on the later-developing skills up through age 6, 7 or 8. Phonemic awareness may be second-nature for adults, but is quite a challenge for young children. That is because when we speak and listen, phoneme boundaries are blurred, and we recognize speech more automatically, at the level of whole words or syllables.

Phonemic awareness does not come naturally to young children, therefore teachers should include it in the curriculum. It is necessary because phonemic awareness is the strongest predictor of later reading skill (Adams et al., 1998). Phonemic awareness and reading go hand in hand. Before children can learn *phonics*, or sounding out printed words they must be able to hear those sounds in spoken language. Children need a good level of phonemic awareness before they can read. But at the same time, learning to read also improves children's phonemic awareness skills.

There is quite a bit of controversy about which phonological and phonemic awareness skills are most important to teach. Some researchers argue that rhyme awareness and alliteration are important early skills that should be the main focus for preschool learners. Others argue that these skills do emerge first, but do not play an important role in how easily children learn to read. Instead, they feel that phoneme segmentation, blending and manipulation are much more important foundations for later reading and writing. In the Learning Connections curriculum, we take a middle ground. We introduce phonological and phonemic awareness skills in developmental sequence, but we also try to move children beyond syllables, rhyme, and alliteration towards the more advanced phonological skills.

Print Awareness

Before children pay attention to letters or try to decode written words, they become aware of writing and print in the world around them. Even if they cannot read themselves, children realize that others can do so. They also know that writing is an important way to share information or tell people what to do. One of the first skills children gain is *logo recognition*, or the ability to recognize familiar names or brand illustrations. A child might recognize McDonald's yellow arches, or the Kool-Aide smiling pitcher and thus "read" store signs or food labels. In the same way, children recognize street signs like "stop," "school crossing," or even their own street sign by remembering the entire sign—shape, color, size, and words. Children also learn that print comes in different forms, such as signs, menus, picture books, phone books, newspapers, and bills. They start to learn that you can go to a particular kind of document to find specific information. This knowledge may be seen in children's dramatic play, as they pretend to read a recipe in the kitchen area, or play the role of a police officer writing a traffic ticket.

Children learn the different parts of books, e.g., pictures, words, cover, author, illustrator, when you discuss them. Children learn book handling skills, such as holding the book right-side up, and turning pages one at a time from front to back. Through modeling, they learn that readers track or follow print from left to right and top to bottom. They can learn to trace with their finger across a page, following the direction that a reader would take. Some children can point to one word at a time in order, or even point to the beginning and end of a sentence.

Alphabet Knowledge

Names and name labels are important in preschool classrooms. For example, we label children's cubbies and belongings, and ask children to sign their artwork. Typically, children learn the alphabet letters that are most common and important in their lives, e.g., the letters in their first name, the first letter in friends' names, the letters in their surname.

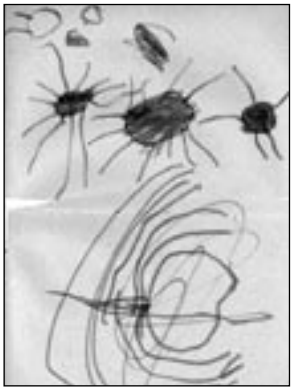
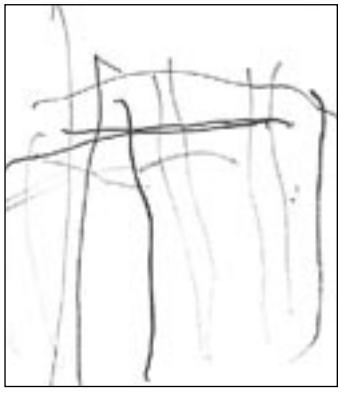
Letter knowledge actually includes several parts. First, there is the name of the letter "bee," "dee," etc. Then, there is the written symbol or printed form of the letter, e.g. B, d. Children tend to recognize either capital or lower case forms first, whichever one the adults in their lives emphasize. Children also tend to first recognize a letter in only a small number of places, e.g., on a wall poster at school or on their cubby label. Gradually, they realize that the same letter symbol can look somewhat different, depending on if it is hand-written or printed, if it is capital or lower-case, what kind of font or letter style is used, and whether or not it is oriented right-side up.

What is needed for reading and writing is knowledge of letter-sound correspondence, or the match between a printed letter and the sound it makes in a spoken word. English is a difficult written language to master because some letters have more than one corresponding sound, and the same sound blends can be spelled in different ways.

In Learning Connections, we emphasize letter-sound correspondence much more than letter names. When children start experimenting with spelling and writing conventional words, knowing that the symbol "W" is named "double-you" is less useful than knowing that "W" says "wuh." We also combine letter-sound activities with phonemic awareness activities. Phonemic awareness instruction is much more effective when it is combined with exposure to letters (Ball & Blachman, 1991; Yeh, 2003). When children have enough phonemic awareness to be able to hear the sounds in spoken words, and they know some letter-sound correspondence, they can start to use these two skills together to try to sound out printed words or write words phonetically. For this reason, we also introduce children to letters and phonemic awareness activities at the same time. After they have learned a small numbers of letters and their corresponding sounds, children can put them together to spell simple consonant-vowel-consonant words, like "hat," "mat" and "sat."

Emergent Writing

Children's emergent writing attempts follow a somewhat reliable developmental progression (Sulzby, Barhardt & Heishima, 1989). This sequence is shown below.

FORM OF WRITING	DESCRIPTION	SAMPLE(S)
Random Scribble	Child does not distinguish writing from drawing. The product may contain lines, circular or back and forth marks, or actual drawings.	 

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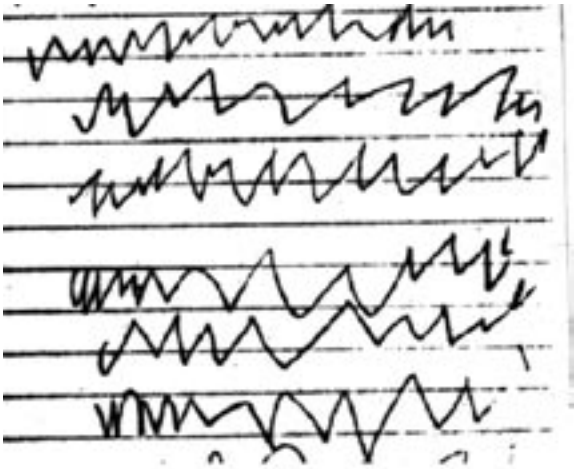
FORM OF WRITING	DESCRIPTION	SAMPLE(S)
Linear Scribble	Child starts to distinguish his or her own writing from drawing. Marks that represent writing are made in lines that look like lines of script. Wavy scribble is quite regular in form. Later, children add more variation in shape and height within the line of scribble, looking more like cursive letters.	
Letter-like forms	Children make separate marks that sometimes resemble letters. Some marks look like the letters O, X or T; others are irregular forms that resemble lollipops or curlicues. In more advanced forms, children will include some real letters and/or group the forms in clusters that resemble words.	
Letter Strings	Children master a small number of recognizable letters and write them repeatedly in short or long strings across the page. Some letter-like forms may be included, as well as the child's name. Some children make dots or dashes between groups of letters, or underline each row of letters. This suggests that children are starting to attend to word groupings and print direction.	

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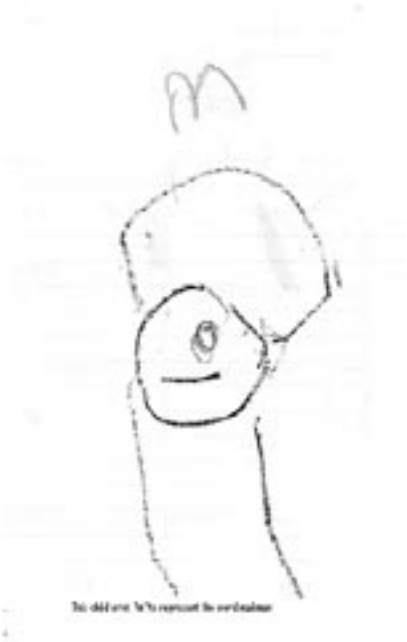
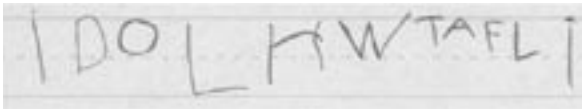
FORM OF WRITING	DESCRIPTION	SAMPLE(S)
Invented Spelling–Initial	he child tries to match their writing to an intended message by writing letters that represent the first sounds of some of the words in their message. Attempts at writing single-word labels, e.g., "M" for "mouse" are seem first. Later, children try to write longer messages, e.g., "iL" for "I like cake."	
Invented Spelling–Partial to Full	In partial invented spelling, the child uses letter-sound correspondence to represent most first sounds, some last sounds, and occasional middle sounds of the words in their message. E.g., "iLk k" for "I like cake." In full invented spelling, the child represents most of the sounds in their intended message using letter-sound correspondence and some rote words. E.g., "I lk cak and icrm" for "I like cake and ice cream."	 

We say this sequence is "somewhat" reliable because children do not use only one level or form or writing at the same time. Children start at the earliest level and gradually add new forms of writing without necessarily abandoning earlier forms. For example, a child may use letter strings when asked to write a get-well card for a sick relative, but use linear scribble when pretending to be a teacher writing on the chalkboard during dramatic play. And as so much emphasis is placed on children writing their names, most children learn to print a readable version of their first name long before they attempt to spell any other words. It is common to see a child fill a page with letter-like forms and then sign their work by printing a few letters of their first name. Since writing is effortful, children tend to show higher levels of emergent writing when they are making a short product and when they have adult support. As the child becomes tired, or if the child is engaged in the excitement of dramatic play, earlier forms of emergent writing tend to be used. At all levels of emergent writing, it is common for children to combine capital and lower case letters, to place letters or words randomly on the page, and to write letters or words upside-down or backwards.

Emergent writing combines several skills. Children need language skills to formulate a message. They need print awareness in order to select the kind of written product they want to make. Aspects of letter recognition may be seen even in letter-like forms and certainly in letter strings. Many children struggle with the fine motor control needed to make letters or letter-like forms. Children combine phonemic awareness, letter symbol recognition, letter-sound correspondence and fine motor skills in producing invented spellings. Many Learning Connections activities help children acquire component skills that they draw upon while writing.

The journaling activities that are our main vehicle for promoting emergent writing, all encourage the child to intentionally form a message and put it down on paper. Children are encouraged to write on a daily basis and to start first by thinking about what they are going to communicate. The journaling and home-made book activities provide children with prompts of what to think and write about. Children are asked to write and share communications that are meaningful and important; they are not asked to write for the sake of practice or drill.

Because writing is so effortful and variable, you should be actively engaged with your children during journaling activities. Through your scaffolding and support—the questions you ask about the child's intentions, your suggestions on when to include different forms of emergent writing, your assistance with spelling or letter formation when children ask for it, your interest in hearing children read their messages to you and you reading your children's message to them—you can help children produce increasingly higher levels of emergent writing as time goes on.

Emergent Mathematics

Like literacy, the development of math skills starts in early infancy and continues across the lifespan. Just as humans are biologically prepared to learn language, we are biologically prepared to learn math. Many math concepts are found in all cultures and historical periods, which suggest that mathematical ideas are natural parts of human thinking (Klein & Starkey, 1988). Even babies and toddlers show some level of mathematical understanding. For example, they notice the difference between small sets of objects. They can tell that a group of 3 red toy cars is not the same as a group of 2 red toy cars. Without literally counting one-two-three, very young are able to recognize these small quantities. In the same way that children learn about literacy through play and everyday experiences, they gain a commonsense understanding of math by engaging in the world around them (Baroody & Wilkins, 1999; National Asspciation for the Education of Young Children & Nation Council of Teachers of Mathematics, 2002; Saxe, Guberman & Gearhart, 1987).

The National Association for the Education of Young Children and the National Council of Teachers of Mathematics have written standards for early childhood mathematics teaching (National Asspciation for the Education of Young Children & Nation Council of Teachers of Mathematics, 2002).

These standards make it clear that preschool math involves much more than learning to count. Young children can be introduced to broad areas of math, including numbers and operations, geometry, measurement, problem-solving, reasoning and proof, mathematical communication, and some forms of data analysis such as graphing.

While most preschool educators receive training in literacy instruction, professional preparation in the area of math is often weaker. The Learning Connections curriculum addresses this gap by having an equal focus on emergent literacy and emergent math. The math activities are carefully sequenced, moving from experiences that teach a single, beginning math skill, to more complex activities that integrate several math skills. Curriculum activities also integrate math with literacy, conversation, and problem-solving. The curriculum exposes children to concepts that often are not introduced at the preschool level, such as graphing, area, and addition. Children should be exposed to such concepts, and they can grasp these ideas when they are presented in the context of interesting situations that involve concrete materials.

Through exploring and problem-solving with familiar objects, children can learn the foundations on which later concepts, like fractions or multiplication, are based. We expect that rich preschool mathematics experiences will help children later in life, when they are expected to learn more abstract mathematical skills.

The Learning Connections math activities address the following mathematical domains:

- Numbers and mathematical operations
- Geometry
- Measurement

Numbers and Mathematical Operations

Counting is one of the foundational areas of math. But even something as seemingly simple as learning to count emerges gradually as children master and then integrate the several component skills that counting requires. Below is the general order in which counting skills emerge.

SKILL	DEFINITION	EXAMPLE(S)
Subitizing	Automatically recognizing the number of objects in a small set (1-5 objects)	Two plates are on the table, one has three grapes and the other plate has two grapes. A child glances at the plates and immediately recognizes which plate has more.
One-to-one correspondence	Matching two sets of objects so that each item in set one is paired with one item from set two.	When setting the table, a child places one napkin by each plate.
Rote counting	Reciting number names in a stable order.	A child habitually recites "One, two, three, four, five! One, two, three, four, five!"
One-one naming	Saying only one number name per object.	The child touches the first object and says, "One," then points to the next object and says, "Two." As the child touches the third object he says, "Four."
Numeral recognition	Naming written numerals.	A child correctly identifies the symbol 2 as "two", 3 as "three," etc.

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SKILL	DEFINITION	EXAMPLE(S)
Cardinality	Knowing that the last number counted in a set of objects represents the total quantity of the set.	A child counts five objects one at a time, saying "One, two, three, four, five. There are five stars!"
Matching numerals and quantities	Matching a numeral to a set of objects of the corresponding number.	A child correctly places five pennies inside a cup labeled "5" and three pennies inside a cup labeled "3".
Counting on	Adding objects to a set and counting the new total without starting from one.	A child has five blocks. Her teacher hands her two more and asks, "How many do you have now?" The child points to the set of original blocks and then to each of the new blocks saying, "Five, six, seven."
Counting groups	Counting groups of objects rather than single objects.	A child gathers three pairs of roller skates from a bin, counting, "One, two three" as he picks up each pair.

In Learning Connection, we introduce children to counting skills in a sequence. First, children practice one-to-one correspondence with small sets. Then, we introduce one-one naming and cardinality, followed by numeral recognition. At the next step, children engage in more complex activities that involve the matching of numerals with different physical quantities. The most advanced enumeration activities focus on counting by groups or parts.

Numerical relations include the concepts of more than, less than, and equal to. Mathematical operations are addition, subtraction, multiplication, and division. Preschoolers can show an understanding of these concepts through concrete objects. For example, they can reason that if extra objects are added to a set, the new amount is more than the original amount. Or that when objects are taken away from a set, there are now fewer or "less" things. Young children demonstrate the foundations of division when they take care to see that each person at their table receives a "fair" or equal share of stickers.

Several Learning Connections activities use manipulatives to introduce children to mathematical operations. For example, children working in small groups each come up with their own ways to fill in a puzzle or grid made of 12 small triangular pieces. One child fills her grid using four green "3-shapes", a trapezoidal shape composed of three small triangles joined together. Another child fills his grid using 12 yellow "1-shapes" or single small triangles. A third child uses six red "2-shapes" a rhombus composed of two small triangles joined together. The teacher and children then discuss how each child found different ways to fill up the grid. Without using numerals or formulas, the children are starting to discover that (4 x 3) = (12 x 1) = (6 x 2) = 12 and that it takes more of a smaller unit than a larger unit to fill the same grid.

Geometry

Beginning geometry includes recognizing and naming shapes. Preschoolers can learn both basic shapes (circle, square, and triangle) and more unusual shapes (e.g., rhombus, parallelogram, trapezoid). They can also learn both two-dimensional (flat) and three-dimensional (solid) shapes. Because you want children to develop a generalized concept of each shape, after the child recognizes a shape in one or two specific instanc-

es, it is then important to expose the child to many examples that differ as much as possible. For example, if you wish to teach the concept of triangle, expose the children to triangles that differ in color, size, relative proportion (e.g., triangles with three equal sides and triangles with very unequal sides), type (e.g. triangles with 90° angles and those without right angles), and material (e.g. plastic, paper, wood). Have children find triangular shapes in the world around them, e.g. pizza slices, pieces of an inlaid box, a corner floor tile. Help children understand how to recognize even unusual examples by talking with them about the ways that shapes are defined, e.g., "A triangle has three sides and three points. Let's see how many sides this piece has."

In Learning Connections, children are introduced to both basic and more unusual shapes, using the correct geometric names (e.g., rhombus rather than diamond or kite). We help children develop generalized concepts by defining shapes and exposing children to many different examples. We also use activities that have children explore the relationships between multiple shapes. For example, children learn that they can put two triangles together to form a larger square. Or they learn to recognize all the smaller squares inside a complex tile pattern that itself is in the overall shape of a house or a rocket ship.

Measurement

Measurement involves comparison and quantification of that comparison. When two children discuss who is taller, or whether one of them has "more" or "the same" amount of play-dough they are estimating amounts that could be measured. Preschool children can learn measurement concepts such as small, large, more, less, and bigger. They can learn to arrange small sets of objects in order of height, size, or weight. They can use nonstandard tools (i.e., something other than a regular ruler or measuring tape) to measure and compare the sizes of different objects. For example, they can use a string to measure one child's height and compare it to the height of that child's friend. They can use their hands to measure the length of two different sleeping mats and combining this information with their knowledge of numbers, can conclude that the red mat that is 10 hands long is shorter than the green mat that is 12 hands long.

In Learning Connections, we introduce children to the concepts of length, height, width, thickness, volume, weight, and area. (To avoid confusion, you should be careful to use the correct measurement term, rather than a vague term like "bigger.") In the past, educators have mistakenly thought that some of these concepts, particularly volume, weight, and area are too complex for preschoolers to understand. But children can grasp these concepts if they are introduced in the right way.

Because it is difficult to define measurement concepts in words that are meaningful to young children, we help children build an intuitive understanding of these terms by using the words when asking children to make simple comparisons. E. g., we ask which one of two objects is longer, thicker, or heavier. After children make their prediction, they measure each object to confirm or disconfirm their prediction. Children can count how many scoops of sand, beans, or water it takes to fill different containers. They can hold stones of different weights and then compare them on a balance scale. A young child may not be able to give an abstract definition of weight or volume, but they can determine which item is heavier or which container holds more than the other. Children can even start to understand advanced measurement concepts like area. In some of the more advanced Learning Connections activities, children measure plastic shapes that look very different, such as a square, a zig-zag, and a long, thin rectangle. Using smaller shapes as a measuring tool, they discover that each of the larger pieces can be covered up with different arrangements of four small triangles. Without using any geometric formulas, the children can understand and demonstrate that each of these very different-looking shapes actually has the same area.

CURRICULUM DOMAINS AND LEARNING GOALS

The Learning Connections curriculum addresses eight major skill domains through 39 specific learning goals. These domains and goals are shown in the table below.

ORAL LANGUAGE

- To increase each child's vocabulary
- To engage in conversations of increased length and complexity

PHONOLOGICAL AND PHONEMIC AWARENESS

- To segment and blend syllables
- To recognize and generate rhymes
- To recognize and generate words with the same initial, final, and medial sounds
- To segment and blend phonemes

ALPHABET KNOWLEDGE AND PRINT AWARENESS

- To identify the correspondence between letter symbols and letter sounds
- To recognize and identify letter names
- To track print from left to right and top to bottom
- To use environmental print
- To become aware of the usefulness of print
- To understand that writing conveys meaning
- To recognize and read consonant-vowel-consonant (C-V-C) words

EMERGENT WRITING

- To convey meaning via writing
- To strengthen fine motor muscles
- To use tools in preparation for writing and drawing
- To encourage higher levels of emergent writing
- To begin to spell simple words
- To follow a left-to-right orientation when writing

NUMBERS AND MATHEMATICAL OPERATIONS

- To understand forward one-to-one correspondence
- To understand and associate quantities and numerals from 1-10
- To use alternative counting units, e.g., counting by halves or threes
- To understand that adding/taking away objects increases/decreases total number
- To introduce the concept of addition using composite units
- To use manipulatives to indirectly perform multiplication/division operations

GEOMETRY

- To identify basic and advanced shapes
- To understand that shapes can be made from two or more combinations of shapes
- To identify a given shape inside a larger array of shapes
- To count occurrences of specific shapes
- To compare attributes of objects, such as shape, size, color, thickness and number of sides and corners
- To use geometric vocabulary terms

MEASUREMENT

- To distinguish alternative dimensions of measurement, such as height, width, length, area and volume
- To use nonstandard units of measurement
- To use a measurement tool that distinguishes between heavy and light
- To use a composite unit to measure items
- To understand the concept of volume
- To understand the concept of area
- To use measurement vocabulary terms

APPROACHES TO LEARNING

- To increase attention to and persistence with Learning Connections activities
- To incorporate newly learned skills in free play

USING THE LEARNING ACTIVITIES

Format of activity description

Goals

Each activity is designed to address one or more specific learning goals. Being aware of the target goal(s) will help you focus your instruction on the intended learning outcomes.

Creative Curriculum Objectives

Many programs use the Creative Curriculum (Dodge, Colker & Heroman, 2002) and Learning Connections activities can be used to meet many of the Creative Curriculum objectives. To show how the two curricula are related, we have aligned each Learning Connections activities with the relevant Developmental Continuum objectives. This makes it easy for you to use your observations of children's performance on Learning Connections activities as evidence to complete the Developmental Continuum (Dodge, 2002) assessment rubric.

Materials

High quality, pleasing materials attract children's interest. Children are also more motivated to take good care of materials they value and enjoy. We designed and selected the Learning Connections materials with care. In the earlier activities, most materials are three-dimensional and realistic as familiar, real-world materials are meaningful for young children and help them learn new concepts more easily. In more advanced lessons, we use more two-dimensional and abstract materials. All necessary materials are listed and in the *Material preparation* section and special instructions are given for materials that need to be assembled. A list of materials and where they can be purchased is included in the Appendix.

You are encouraged to modify materials in order to integrate them with classroom themes or other relevant curriculum content. For example, if children are learning about ocean life, and the scheduled Learning Connections activity involves the identification of initial sounds, feel free to choose objects that relate to the ocean. Or have your children work in their journals drawing or writing about their trip to the aquarium.

Directions

Each activity has step by step instructions for conducting the lesson with a small group of children. We include suggested questions to ask as well as possible responses that children may make. For quick reference, the suggested teacher questions are printed in italics and enclosed within quotation marks. Please remember that suggested questions are intended to be used as samples only; the exact question you chose to use will depend on the children involved.

Variations

Although the lessons are developmentally sequenced, each activity also includes specific strategies to increase or decrease the difficulty of the lesson. Individualizing activities to meet the needs of the child is key to any early childhood curriculum. By including a number of variations, we increase the likelihood that you will be able to tailor the lesson to each child's needs. However, not all activities are suitable for all children. You may have a child who is not yet ready for even the earliest variation of an activity, while another child has already mastered the most challenging variation. When this happens, simply select activities from earlier or later in the general developmental sequence, so that each child is presented with lessons at a suitable level.

Vocabulary

Each activity includes key words to stress to the children as you work. These words are important concepts covered in the lesson and also serve to enlarge children's vocabularies.

Additional Considerations

Group Size

Most Learning Connections activities are done in small groups consisting of one teacher and one to four children. This allows each child to have more direct contact and attention. When groups are small, quite a bit of high-quality instruction can occur in a short period of time, e.g., five to fifteen minutes. Small groups also minimize management problems and allow you to more closely observe each child's response. The optimal group size depends on the children involved and the familiarity of the activity. Younger children, English language learners, distractible children, or children with special learning needs often benefit from working one-on-one or in very small groups. You may also choose to work with fewer children when introducing new activities.

Organization of activities within the manual

The activity descriptions are organized according to the curriculum learning domains. Within each domain, activities are listed in developmental sequence. Early-appearing activities provide the foundational skills for later, higher-level activities. Later activities also integrate many of the skills introduced early on.

Balancing structured and self-directed learning

When an activity is first introduced, you will probably take more control of the lesson, giving demonstrations and explanations. Once children are familiar with the general expectations of the activity, you can move from a more teacher-directed style to a more child-initiated approach. Children also need time to explore and practice with the Learning Connections materials, discovering and reinforcing for themselves the concepts that each activity conveys. To encourage independent and peer-assisted exportation, the Learning Connections materials should be made available to the children throughout the day.

FAMILY ACTIVITIES

The family activities are an important and necessary part of the Learning Connections curriculum. Parents and other family members are children's first and most lasting teachers, and preschool experiences are most beneficial when teachers and families work as partners in promoting children's learning.

The family activities address the same learning goals as the classroom activities. However, they use simpler materials and are easy to fit into everyday family routines. Concepts do not appear in the family activities until they have first been introduced in class. Since children already have some understanding of an activity, when they first try it at home the experience generally goes smoothly. Through the family activities, children learn to transfer their knowledge to a wider range of situations. Parents provide an invaluable experience by showing children that the same concepts they work on at school are also important in their home and community life. Parents usually find the home activities to be enjoyable and eye-opening. They take great interest and pride in discovering how much their children are capable of learning. And both parents and children enjoy the chance to spend quality time together.

Activity: Sound Bingo

GOAL:

To recognize words that start with the same sound

CREATIVE CURRICULUM DEVELOPMENTAL CONTINUUM:

#38: Hears and discriminates the sounds of language
#46: Demonstrates knowledge of alphabet

MATERIALS:

a basket for cards
a set of sound bingo cards

MATERIAL PREPARATION:

Choose two to four alphabet sounds with which the children are familiar. Choose the corresponding sound bingo cards.

DIRECTIONS:

1. Gather all of the materials.

2. Select the children with whom you will work and invite them to join you. You may want to work one on one with a child.

3. Pass out a blank bingo card to each child and explain that each card has objects that match the beginning sound of the picture on the card. *"Michael, you have the /s/ bingo card. Sarah, you have the /t/ bingo card."*

4. Ask each child, *"What sound bingo card do you have?"*

5. Explain to the group that *"each of you will get to choose a card from the basket. After you choose a card, you decide whether the beginning sound matches your card or a friend's card. Let's try one together."*

6. Take out a card. *"Look, it's a seal. Who has a card that has the same beginning sound as /s/, /s/, /s/ seal?"* Hand the child who responds the picture card to place on her bingo card.

7. Continue until all of the children have filled their nine spaces.

VARIATIONS:

1. For a child who is unable to differentiate between sounds, do the activity one on one. Have the child take a picture card and place it on her bingo card. Say, "/s/ is for seal, /s/ is for slug," and so on. When a child is ready, increase the number of playing cards. The next time you play sound bingo, invite the child to join play with other children.

2. Encourage a child who has mastered completing one card to work multiple cards.

3. After the children have mastered the beginning sound activity, play with the ending sounds. Put one picture at the top of the child's card and have her fill the card with additional pictures that have the same final sound.

Activity: Shapes That Make A Shape Set (Part II)

GOALS:

- To understand that shapes can be made from two or more combinations of shapes
- To identify a given shape inside a larger array of shapes
- To count occurrences of specific shapes

CREATIVE CURRICULUM DEVELOPMENTAL CONTINUUM:

#23: Approaches problems with flexibility
#24: Shows persistence in approaching tasks
#26: Applies knowledge or experience to a new context
#40: Understands and follows oral directions
#41: Answers questions

MATERIALS:

set 2 of plexiglas shapes: eight isosceles right triangles, a larger isosceles triangle, a square, and a parallelogram

set 3 of plexiglas shapes: a large rhombus, four triangles, a square, and a trapezoid

8 ½" x 11" cards of line drawings of a house and a flower (see Appendix 3)

VOCABULARY:

square, rhombus, rectangle, triangle, trapezoid, and how many

DIRECTIONS:

1. Gather all of the necessary materials.

2. Select the children with whom you will work and invite them to join you. You may also one on one with a child.

3. Review shapes with the children.

4. Give the children the basket of right isosceles triangle from Set 2 and give each child a house card.

5. Have the children fill in the houses with the right isosceles triangles. Ask them about what they have done: *"Tell me about what you did. What shapes did you use? How many of the shapes did you use?"*

6. Hand each child additional shapes from Set 3: a square, a rhombus, and a triangle. *"Here are some other shapes. Place these new shapes on top of the triangles."*

7. *"Tell me about what you have done."* Listen to their responses and then ask them to count how many times the larger shapes appear in the whole design.

8. Point out the shapes that are within other shapes. The square, for example, is made of four triangles; the large triangle is made of two small triangles.

9. Repeat the activity with the flower drawing.

A VARIATION:

1. Create additional drawings related to a classroom theme. Invite the children to fill in these drawings.

Activity: Area with Tangrams (Part II)

GOALS:

- To learn that new shapes can be made from two or more instances of a given shape
- To understand the concept of area
- To see that a square, triangle and parallelogram can have the same area

CREATIVE CURRICULUM DEVELOPMENTAL CONTINUUM:

#7: Respects and cares for classroom environment and materials
#23: Approaches problems flexibly
#24: Shows persistence in approaching tasks
#28: Compares and measures

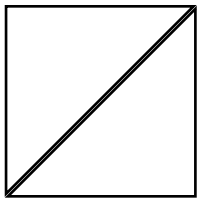
MATERIALS:

six small tangram triangles
one medium tangram triangle
one tangram parallelogram
one tangram square

VOCABULARY:

area and parallelogram

[STEP 5]



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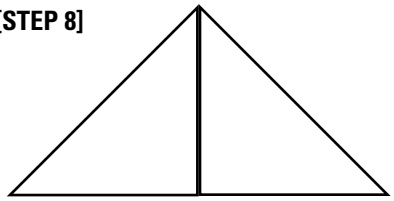
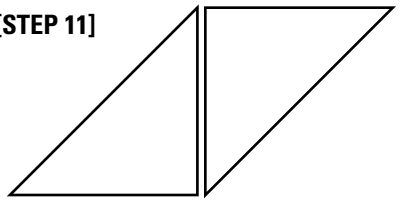


[STEP 11]



DIRECTIONS:

1. Gather all of the necessary materials.

2. Select the children with whom you will work and invite them to join you. You may also work one on one with a child.

3. As you give each child a pair of small triangles, identify what you are giving her.

4. Place the square at the top of the table or carpet space. Review each shape's name.

5. Ask the children to make a square with their two triangles. If necessary, use your own triangles to show the children how to make the shape.

6. *"How many triangles did you use to make a square?"* Wait for their responses. *"Yes, the square is made of two small triangles."*

7. Explain that the area of their squares is two small triangles. Have the children repeat that *"the area is how much space is covered."*

8. Place the medium tangram triangle at the top of the table. Tell the children, *"Please make a large triangle with your two triangles."*

9. *"How many triangles did you use to make the larger triangle?"* Wait for their responses.

10. *"The area of the large triangle is two small triangles."* Ask the children to repeat, *"The area is how much space is covered."*

11. Place the parallelogram at the top of the table or carpet space. Ask the children to make a parallelogram with two triangles.

12. *"How many triangles did you use to make the parallelogram?"* Wait for their responses.

13. *"The area of your parallelogram is two small triangles."* Ask the children to repeat, *"The area is how much space is covered."*

14. Summarize what they have done. *"The three shapes were made from two triangles. The triangle, square, and parallelogram each of you made had the same area or covered the same space."*

VARIATIONS:

1. Look around the room and compare other areas, such as a piece of notebook paper to the table top or to a child's blankets. Place the paper on top of the table to show the different areas.

2. The children can count how many shapes are used to make a new shape. Invite them to use the same two to four shapes to make a different shape. Talk with the children about the different shapes they created.

CHILD'S NAME

LEARNING CONNECTIONS

Meal Time Fun

LEARNING GOAL FOR YOUR CHILD:

To notice beginning sounds of words

MATERIALS:

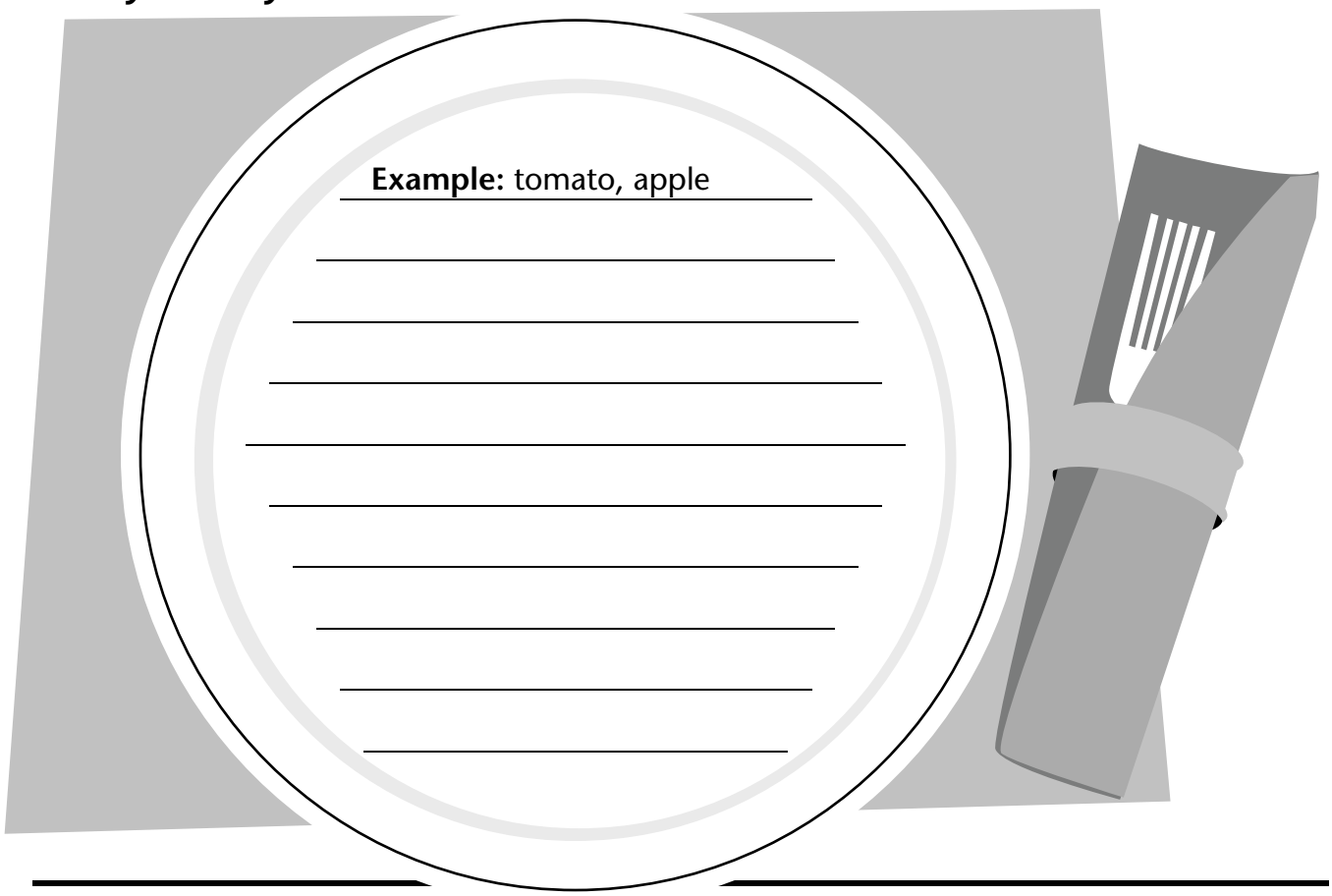
meal
paper

DIRECTIONS:

1. As you are cooking a family meal or just before your child starts to eat, talk with your child about the foods that he/she will eat.
2. Say the beginning sound of the word with your child. For example, *"Fish starts fff," or "RRR is for rice."*
3. Write the names of the foods you talked about in the space below.
4. Enjoy your meal!

Please return the completed activity and feedback form to your child's teacher.

My Family's Dinner



Example: tomato, apple