



*We Can Early  
Learning Curriculum*  
**RESEARCH  
FOUNDATION**

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## Introduction

Upon entering kindergarten, children must be prepared for formal schooling and ready to learn. As children move into the era of more rigorous standards, such as the Common Core State Standards (National Governors Association Center for Best Practices and Council of Chief State School Officers, 2010) or individual state standards, exposure to foundational skills as early as possible becomes particularly important. A strong foundation serves as stepping stones to academic success and ensures students are college and career ready by the time they finish high school. However, building the strong foundation for learning to read and reading to learn begins prior to formal schooling (Preschool Curriculum Evaluation Research Consortium, 2008; Schickedanz & Collins, 2013). Providing children with experiences that “foster oral language and content knowledge, literacy skills, and thinking, early childhood professionals help secure children’s later academic success” (Schickedanz & Collins, 2013, p. 2). Conveyed more strongly, “conventional reading and writing skills that are developed in the years from birth to age 5 have a clear and consistently strong relationship with later conventional literacy skills” (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2010, p. vii).

In past years the importance of preschool has been overlooked for many reasons, but chiefly due to perceptions that preschool was not part of American public education because it did not receive governmental funding (Takanishi & Kauerz, 2008). Preschools exist in many forms with many delivery systems and utilize teachers with varying teacher credentials. Recently, preschool programs are receiving national attention regarding the importance of developing foundational skills in early literacy, language, numeracy, and science to enable readiness for academic learning. Additionally, Daily, Burkhauser, and Halle (2010) point out there is a school readiness divide between low-income children and their more affluent peers when children enter kindergarten. Improving long-term academic outcomes for all children, according to Daily, et al., requires increased attention to ensuring all children are ready for school through the use of successful, evidence-based programs in early childhood.

In light of the current and pending changes in the landscape of preschool programs, *We Can™ Early Learning Curriculum* was revised, keeping the fundamental structure and pedagogy, to align with all state, national, and agency standards, including the Common Core State Standards (CCSS) for kindergarten. The name of the program was changed to reflect the emphasis on early learning. The research- and evidence-based effective practices originally included in the curriculum were maintained, but updated research and additional information for improving instructional effectiveness were included in the revision. Other sources of guidance in the revision of *We Can Early Learning Curriculum* included the Head Start Child Development and Early Learning Framework (U.S. Department of Health and Human Services [USDHHS], 2010) and the National Association for the Education of Young Children’s (NAEYC) 2009 position statement on best practice in early childhood education.

It is understood that the quality and positive child outcomes of a preschool program is a complex system influenced by many factors, including but not limited to “adequate materials, curricular support, skilled teaching assistants, and a physical setting that is appropriate to meeting the needs of young children” (Early, et al., 2007, p. 577). The purpose of this research foundation report is to describe components of this complex system and present research that identifies age-appropriate classroom practices that develop foundational skills in early childhood domains, such as language, literacy, writing, numeracy, and science. Additionally, this report will show how the educational practices from *We Can Early Learning Curriculum* provide the needed infrastructure and instructional support for these foundational skills. These practices are needed to develop and maintain a high-quality preschool program that will result in children who are prepared for learning when they enter kindergarten.

## Comprehensive Curriculum

It is clear that preschool children are capable of more academically than was once thought (Wright & Neuman, 2009). While the academic disciplines of language, literacy, mathematics, and science are important in a quality

preschool curriculum, the areas of music, arts, movement, history, social sciences, and social-emotional learning, to name a few, all have a place in a well-rounded curriculum (Wright & Neuman, 2009). Research has shown that children's cognitive skills near the time of entry to kindergarten are a potent predictor of achievement in first grade and beyond (e.g., Downer & Pianta, 2006). Social competence, or social-emotional development, also has been found to be a significant predictor of achievement in first grade and beyond. When examining cognitive ability in combination with social competence at the beginning of kindergarten, risk factors that may have been negative influences on an otherwise competent child, such as poverty and lack of opportunity to learn, did not greatly influence their abilities. In other words, children entering kindergarten with strong cognitive and social-emotional abilities will be academically ready for the rigor of kindergarten, first grade, and beyond, regardless of early life experiences.

Frede and Ackerman (2007) suggest preschool curricula vary in their content, rigor, and instructional effectiveness, and there is a lack of consensus about quality-control measures for preschool curricula. However, newly revised state and agency standards have been developed to increase the instructional rigor and effectiveness of preschool curricula to ensure children are ready for academic learning upon entry in kindergarten. NAEYC and the National Association of Early Childhood Specialists in State Departments of Education (NAECS/SDE) provide information about what constitutes an appropriate curriculum for children in preschool. NAEYC and NAECS/SDE (2003) issued a joint statement about early childhood curriculum with a recommendation to "implement curriculum that is thoughtfully planned, challenging, engaging, developmentally appropriate, culturally and linguistically responsive, comprehensive, and likely to promote positive outcomes for all young children" (p. 2). *The Synthesis of IES [Institute of Education Sciences] Research on Early Intervention and Early Childhood Education* (Diamond, Justice, Siegler, & Snyder, 2013) suggests four contributions with regard to classroom environments that produce positive children's outcomes. These include a critical association between the quality of teacher-child interactions, the nature of teachers' feedback to children, and positive children's outcomes; collaborations between teachers and parents and positive teacher-parent relationships associated with children's academic and social competence; improving the quality of emotional and instructional support being related to positive social and academic gains; and higher levels of attendance being associated with higher rates of learning.

*We Can Early Learning Curriculum* provides teacher support for age-appropriate, explicit modeling and guidance by integrating learning across developmental domains and academic subject areas on a daily basis. Thoughtful planning based on current research and best practices went into the design of the *We Can Early Learning Curriculum*. Organized into biweekly or monthly thematic units, each Teacher's Edition contains lesson plans for two months of instruction and guided practice using whole-class and small-group activities. In each unit, every day is filled with whole-class, small-group, and extension activities so that all children can actively apply what they are learning. The day is carefully planned so teachers can help children engage in collaborative conversations about theme-related topics, read fiction and nonfiction books with the children, and encourage them to interact and respond to each text.

*We Can Early Learning Curriculum* is developmentally appropriate for preschool instruction and guided practice. Daily lesson plans include suggestions for differentiating instruction to ensure the diverse and unique needs of children are addressed. Suggestions for differentiating teaching are provided so that teachers can support and enhance comprehension for children with special needs or language differences. Whole-class interactive activities are where teachers introduce new ideas, vocabulary, and concepts related to the thematic unit under discussion. Teachers also read books to and with children and act out story parts and character roles. Children are encouraged to participate in whole-class activities such as singing, creative movement, and role-play. *We Can Early Learning Curriculum* also includes explicit small-group instructional activities that are related to the information presented in whole-class lessons, ensuring there is continuity between whole-class and small-group work.

The unique design of the daily lessons creates opportunities for all children to work with a teacher in a small group and receive explicit instruction and immediate feedback to clarify concepts, language, and potential misunderstandings and adjust so that children feel confident and competent when learning new information. The Work Table provides another opportunity for young children to engage in conversations with an adult to review previously taught concepts or skills. Activities at the Work Table develop oral language and encourage the use of vocabulary words in conversations to enhance comprehension. Children enjoy applying what they have learned and receiving careful guidance as they explore new learning experiences.

*We Can Early Learning Curriculum* is culturally and linguistically responsive to all children who participate. Specifically, *We Can Early Learning Curriculum* is a multilingual program that anticipates diversity and differences in language development, offering multiple options for children to engage, communicate, and respond to experiences. Many of the online and print materials in *We Can Early Learning Curriculum* include multiple language experiences using English, Spanish, and American Sign Language (ASL).

Introducing new words and ways to communicate using multiple languages has many advantages for all children. ASL is a gestural language, and it is the first language or communication method that many children use to express needs, emotions, and ideas. ASL extends children's natural tendency to gesture, talk, and act out their words to express their ideas. Signing keeps children engaged and on task. All children can use ASL to communicate their needs and thoughts and participate regardless of language differences. In fact, use of ASL is also a positive addition to classroom management, directing children to stay on task, demonstrating expectations, or cueing behaviors such as listen, do, or wait.

Extensive support for English language learners (ELLs), those who are proficient in a language other than English, and dual language learners, those who have not acquired proficiency in any language, is included in *We Can Early Learning Curriculum*. Besides the many instructional tools for differentiating instruction and practice, teachers are encouraged to use different techniques for children at different stages of language acquisition. For children in the preproduction stage, where children are often silent because of a lack of understanding, teachers are encouraged to ask questions and use hands-on activities that can be responded to nonverbally. In the second stage, early speech, when children are just starting to speak, teachers ask yes/no questions and questions in which a choice of response is provided. During stage three of language acquisition, speech emergence, more elaborate speech gradually occurs. Children will start with phrases, and then progress to sentences that may still contain omissions. Teachers are encouraged to ask questions that require children to produce language, such as short explanations. In the final stage, intermediate fluency, children appear to be almost fluent speakers.

*We Can Early Learning Curriculum* is comprehensive, meaning daily lessons include activities for teaching and practice in all domains of learning. These domains are Social and Emotional Learning, Social Studies, Language and Vocabulary, Literacy, Phonological Awareness, Pre-Writing, Math, Science, Physical Development, Fine Arts, and Technology. The Scope and Sequence, located at the back of each Teacher Edition, clearly lists the sequential presentation of skills and concepts taught in *We Can Early Learning Curriculum*. The curriculum is a full-year program with lesson plans and curriculum materials to be used during the school year and for summer enrichment programs or to support 12-month preschool programs.

The following are components included with *We Can Early Learning Curriculum*.

- *We Can Early Learning Curriculum* includes six Teacher Editions, each one containing two months of instructional support. The Teacher Editions follow consistent routines and procedures for teaching and children's participation, making them learner- and user-friendly. Different activities are color-coded. Green boxes indicate whole-class activities that include social studies concepts related to units, specific concepts, or skills. Orange boxes contain content for small-group lessons involving language, literacy, math, and science. Small, yellow boxes to the right

of the orange boxes contain suggestions for differentiating instruction. Everything that a teacher needs is at point of use to enhance instructional effectiveness.

- *We Can Classroom Management System* is a research- and evidence-based classroom management system that allows teachers to manage the environment while children learn to manage themselves within the structure provided by regularly anticipated routines. The system incorporates whole-class and small-group instruction and Learning Centers for positively and proactively creating order in the environment so teachers and students can focus on instruction.
- *I Can Draw Pre-Writing Program* provides explicit instruction for learning to print. The five pre-writing strokes and Directed Drawings are used to teach alignment, spacing, and organization as a preface to teaching children to print letters and numbers. Embedded drawing activities connected to the units help children develop skills allowing them to use the pre-writing strokes to print alphabet letters, numerals, and words.
- The Letters, Sounds, and Strokes (LSS) component provides comprehensive language and phonics instruction in English, Spanish, and American Sign Language. Each card focuses on a letter. On the front of the card is an illustration children look at while the teacher reads a short story about the illustration from the back of the card. A real-world example of the illustration is referenced and available in the Picture Card set. Also available for the teacher are collaborative practice and phonemic awareness notes and skill practice. For practice and reinforcement, *The Learning Zoo* technology, described below, extends learning of letters and sounds.
- An extensive literature collection, including 12 Informational Text Big Books in English and Spanish and a classroom literature set that includes 34 read-aloud books, is included in *We Can Early Learning Curriculum*. This literature is included in lesson plans with support for helping teachers conduct close reading activities by engaging children in discussion about the stories and texts.
- Manipulatives, instruction support materials, and a wide variety of picture, letter, and word cards in English, Spanish, and ASL are included to support the lessons in *We Can Early Learning Curriculum*.
- The Extend section of a daily lesson includes art, music, and creative movement activities that encourage exercise, coordination, cooperation, and physical development. These activities can be used during transitions, as extensions, or to wrap up the concepts for the day.
- PEP Talk (Parents and Educators Partner and Talk), a home-school newsletter for every unit of instruction, is available in English and Spanish. Along with other home-school connection suggestions, teachers can communicate with families in many ways.
- *The Learning Zoo* technology includes games and activities for reinforcing and recognizing colors and color words, numerals and number words, shapes, applying skills for sorting, comparing and counting, establishing one-to-one correspondence, phonological awareness, learning letter sounds and names, and emergent writing. Games and activities are available in English and Spanish.
- Assessment and progress monitoring include multiple opportunities to monitor children's progress and to report achievement.
  - Observational data are recorded while children are playing or participating in activities.
  - Work samples completed by children demonstrate their progress over time.



- o Unit Checklists that include the five Daily Key objectives for each unit monitor children's responses to instruction to ensure they understand what is taught and how to use the information. Copies of the Unit Checklists are sent home to report progress to a child's family.
- o *We Can Benchmark* is a comprehensive evaluation tool that provides a snapshot of a child's skill level in multiple domains during their preschool years. This assessment tool provides targets at the beginning, middle, and end of the year to help teachers determine which children are making sufficient progress and which children might need modified instruction to progress sufficiently. This information is also available to share with families during conferences.

*We Can Early Learning Curriculum* is designed to promote positive outcomes and is challenging and engaging for all young children. The units will captivate children and provide teachers with interesting materials they can use to encourage children to become familiar with themselves and their world. *We Can Early Learning Curriculum* meets all the qualifications for an appropriate curriculum for young children and is based on research and evidence.

## **Social and Emotional Learning**

*The Head Start Child Development and Early Learning Framework: Promoting Positive Outcomes in Early Childhood Programs Serving Children 3–5 Years Old* (USDHHS, 2010) defines social and emotional development as the "skills necessary to foster secure attachments with adults, maintain healthy relationships, regulate one's behavior and emotions, and develop a healthy concept of personal identity" (p. 9). As noted earlier, social-emotional development has been found to be a significant predictor of achievement in first grade and beyond (Downer & Pianta, 2006). Or put another way, during preschool, "a child's abilities to understand self and others; regulate emotion, attention, and behavior; make good decisions; and engage in a range of prosocial behaviors all work together to grease the cogs of a successful school experience" (Denham & Brown, 2010, p. 653). Denham and Brown further explain the relationship between social-emotional learning and greater academic success. Children who have more social-emotional learning competencies tend to participate more, which leads to being more accepted by other children and teachers, which leads to getting more instruction and positive feedback from teachers, leading to a more positive attitude about school and, ultimately, better success in school in general. The benefit of good social and emotional development can be demonstrated by also looking at the negative. "Children with emotional or behavioral challenges are likely to receive less adult support for development and learning and to be more isolated from peers" (USDHHS, 2010, p. 9). The domain elements for social and emotional development include: social relationships; self-concept and self-efficacy, self-regulation, and emotional and behavioral health.

*We Can Early Learning Curriculum* provides teachers the tools to build a climate that fosters social and emotional learning throughout the day and throughout the year. As one of these tools, the *We Can Classroom Management System* helps teachers establish consistent routines and procedures that help children develop self-regulation skills as they learn to cooperate and collaborate with their peers. Children learn to make decisions and assume responsibilities in the classroom community. The Rotation Chart and Job Chart within the *We Can Classroom Management System* are proactive tools for teaching self-regulation, organizational planning, choice-making, responsibility, and accountability. Social and emotional learning skills are also taught explicitly during daily lessons. Examples of the goals of the explicitly taught skills include:

- Communicates about needs, thoughts, and feelings using role-play or gestures.
- Engages in activities, meeting new people and making new friends.

- Cooperates with others by taking turns.
- Begins to understand the connection of feelings and behaviors.
- Demonstrates feelings of competence and independence by making I CAN statements, e.g., “I can jump” or “I like to paint.”
- Demonstrates persistence and maintains self-control when trying to solve simple problems.

The social and emotional learning skills that are explicitly taught and facilitated by the *We Can Classroom Management System* provide a classroom environment that truly encourages and supports children’s social and emotional learning.

### **Language and Literacy Development: Oral Language, Vocabulary, Phonological Awareness, Phonics, and Alphabet Knowledge**

Within this area of development are listening and speaking, or oral language; vocabulary development; phonological awareness; phonics; and alphabet knowledge (Piasta & Wagner, 2010; Wright & Neuman, 2009). Vocabulary and other aspects of oral language are important predictors of children’s reading comprehension. According to Hart and Risley (2003), the relative size of the preschool vocabulary across income groups can persist into middle school and beyond. Children with a small vocabulary during preschool tend to maintain a relatively small vocabulary into middle school. Early childhood programs, therefore, need to incorporate vocabulary and oral language development into the daily routine using extended discourse, reading stories, talking about stories, and conversation between children and between children and adults on a given topic sustained over many exchanges (Hougen & Smartt, 2012). Research suggests providing modeling, instruction, and multiple practice opportunities will develop attentive listening skills and solidify vocabulary enrichment (Foorman, Anthony, Seals, & Mouzaki, 2002; Hougen & Smartt, 2012; Kuhl, 2004).

When children become aware that words are constructed of smaller units of sound and that these units can be manipulated and changed, they are developing phonological awareness (Moats, 2000; Schickedanz & Collins, 2013). According to Foorman, et al. (2002), there is a developmental pattern to the way children develop phonological awareness. Mainly in the preschool years, children can identify similar and dissimilar sounding words first. Next, children are able to blend phonemes and finally to remove a sound from a word, known as phoneme deletion. Others agree this is the flow of phonological awareness but indicate this is not a linear process. Skills develop in an overlapping fashion and children benefit from overlapping instruction as well (Anthony, Lonigan, Driscoll, Phillips, & Burgess, 2003; Lonigan, 2006; Schickedanz & Collins, 2013). Looking at phonological awareness acquisition another way, detecting syllable segments comes first, then onset and rime segments, and finally phoneme recognition comes last (Schickedanz & Collins, 2013). It is suggested that preschool teachers should provide intentional instruction in phonological awareness by “reading books to children that focus on rhyming and alliteration, singing songs, chanting nursery rhymes, and using musical instruments to clap out words and syllables” (Wright & Neuman, 2009, p. 6).

One of the areas of literacy and language development that has been a bit controversial is alphabet knowledge or the alphabetic principle. We have evolved from a time where preschool children were not expected to learn any letter names or sounds to, more recently, the realization that not only are preschool-age children capable of learning letter names and sounds, but that research now shows it is advantageous for them to do so (e.g., Piasta, Petscher, & Justice, 2012; Piasta & Wagner, 2010; Schickedanz & Collins, 2013; Wright & Neuman, 2009). In fact, Piasta et al. (2012) go as far as to suggest that children who have learned what they determined to be the optimal number of letters—specifically 18 uppercase letters and 15 lowercase letters—by the end of preschool



will have success in literacy tasks in kindergarten and beyond. Guidelines to learn some number of letters have not been accepted by all states as the goal; however, more states are adopting some sort of guideline for the number of letter names learned by the end of preschool. Research has not determined the order in which preschool children should learn letters or the number of letters that should be learned at a time, but what seems clear is that learning the first letter of a child's own name is a place to start (Schickedanz & Collins, 2013).

*We Can Early Learning Curriculum* provides opportunities for oral language development while at the same time expanding children's vocabulary. Children talk, share ideas, and name and describe objects. They learn to identify sounds, rhymes, rhythms, and chants. Children clap and count word parts and sing. They listen for the melody and expression in spoken language. Additionally, children listen to stories, focus on print, repeat words, and participate in collaborative conversations that reinforce word knowledge. They use words to name, describe, and compare objects and actions in a language- and print-rich environment. Each unit includes both fiction and nonfiction books that support the unit concepts and enhance understanding of related thematic vocabulary.

*We Can Early Learning Curriculum* provides explicit instruction and guided practice that develops phonological sensitivity for hearing and using sounds in language and literacy. Using the LSS component, teachers help children develop phonemic awareness, phonics, and alphabet knowledge with systematic instruction. The LSS letter cards provide instruction for teaching pre-reading skills that include isolating and blending sounds, segmenting words into parts, combining parts to say the words, and associating sounds with letters represented in print. Through classroom activities, children hear, see, say, and do as they move to rhythms and songs. In a learning center, children play games on the computer where alphabet characters introduced in LSS come alive to reinforce letter names and sounds.

## **Print Awareness and Emergent Writing**

Print awareness—also referred to as print knowledge—is a strong foundational skill for children's early literacy development that helps children begin to understand that spoken language can be represented in print (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2010; Schickedanz & Collins, 2013; Whitehurst & Lonigan, 1998). Print awareness involves understanding that books and other print materials are constructed based on a set of conventions that make them accessible and that can be understood by young children even before they are able to read. These print conventions for English specify that print is read from left to right and from the top of the page to the bottom, with text progressing from the front of the book across pages to the back of the book. Additionally, there are differences between text and illustrations and differences between covers and pages of a book. There are spaces between words and periods at the end of sentences. Also print conventions include rules about the use of uppercase and lowercase letters, as well as the use of punctuation marks (Schickedanz & Collins, 2013; Whitehurst & Lonigan, 1998).

The emergent phase of writing starts at about 1 year of age and continues into the first grade (Schickedanz & Collins, 2013). According to Schickedanz and Collins, there are three sub-phases in the emergent period of writing:

1. Pre-representational—Infants and toddlers explore mark making and the tools used to make those marks, without intending to convey a message or meaning.
2. Intentional representation with multiple symbol systems—Younger preschool children make marks that convey meaning. Children use scribble or mock words to help represent meaning but are still dependent on describing meaning orally. Drawings and paintings have more details and children have more to say when adults ask them about their writing and drawing.
3. Intentional representation with more balanced symbol system—Older preschool children and kindergarteners create drawings that convey even more meaning. Marks intended to be writing

contain letter-like forms and the words may be readable even though they are creatively spelled. Explaining the meaning of the drawings and writing requires the use of oral language, since it is still not possible to convey all the meaning with only written words and drawings at this point.

Baghban (2007) also indicates three phases of emergent writing: scribbles, labels, and stories. Baghban indicates that “drawing provides people and objects that need labels, motivating children to learn the vocabulary with which to write; it also serves as a prompt for story writing when the writer is blocked or lacks sufficient writing skills” (p. 21). Baghban concluded “the partnership in the development of drawing and writing is clear” (p. 21).

Puranik and Lonigan (2011) determined that writing develops sequentially, meaning it would not be worth the time and effort to teach a child the letters of the alphabet when that child is still in the scribbling phase. Puranik and Lonigan suggest that interest in writing can be facilitated by providing opportunities to use writing skills and by providing the necessary writing tools. Scaffolded support—such as prompts, cues, modeling, and feedback—is beneficial, as is encouraging scribbling and pretend writing during play time.

*We Can Early Learning Curriculum* provides numerous tools and experiences that expose children to print and encourage interest in emergent reading and writing. The Read Aloud Routine, one of the important instructional routines, provides 10 steps that should be followed when text is read, whether it is a story, passage, or poem, to help children organize and store information they learn as well as point out the print conventions. The Read Aloud Routine provides teachers with an orderly way of approaching text, reading to a stopping point and thinking about the meaning and engaging in collaborative conversation. With multiple literature and informational texts in each unit, children will hear and see print conventions often with the use of the Read Aloud Routine. The *I Can Draw Pre-Writing Program*, included with the *We Can Early Learning Curriculum*, reinforces the development of top-to-bottom alignment and left-to-right orientation, as well as positional words, top, bottom, left, and right.

The *I Can Draw Pre-Writing Program* also provides teachers with explicit instruction for learning to print by learning to create shapes, draw objects, and print using pre-writing strokes. The pre-writing strokes are introduced in whole-class activities, practiced in small-group settings at the Teaching or Work Tables with teacher support, and reinforced through activities using finger paint, shaving cream, or wipe-off boards and markers, for instance. During Directed Drawings, teachers model how to combine pre-writing strokes to complete a whole picture. Children realize that the whole is equal to the sum of its parts and can see how to break down a complex figure to reproduce it. Directed Drawings help children develop coordination, correct grip and pressure with writing tools, correct orientation and alignment, and integration of lines to create shapes. The *I Can Draw Big Books* use the basic pre-writing strokes to complete drawings that relate to the thematic units. The experiences integrate vocabulary and big ideas from the units in learner-friendly formats that are highly interactive and creative.

## **Mathematics, Science, and Social Studies**

Mathematics skill is also a strong predictor of children’s future academic success (Duncan, et al., 2007, Ginsburg, Lee, & Boyd, 2008). Children demonstrate an intuitive understanding about mathematics and spontaneous math play on their own (Bowman, Donovan, & Burns, 2001; Wright & Neuman, 2009). Children enter formal schooling with varying degrees of informal mathematics understanding, which can then be consolidated and reinforced into more formal understanding with opportunities to use and extend mathematical concepts and skills (Bowman, et al., 2001). This informal mathematics, or everyday mathematics (Ginsburg, et al., 2008), includes informal ideas about more and less, taking away, shapes, size, location, patterns, and positions, learned in an everyday environment without direct instruction.

In the past, mathematics instruction in preschool, if it has been part of the preschool curriculum at all, has been narrow and limited (Ginsburg, et al., 2008; Wright & Neuman, 2009). Presently, this is not the general consensus for many reasons and, as a result, the suggested areas where preschool children should advance in mathematics prior to reaching kindergarten include: numbers and operations, patterns and algebraic thinking, geometry and spatial sense, measurement, and data analysis and collection through displaying and analyzing data (NAEYC and National Council of Teachers of Mathematics [NCTM], 2002; NCTM, 2007; Wright & Neuman, 2009). In addition to these areas, children are capable of engaging in mathematics reasoning and problem-solving as well as discussing their work, which requires a healthy mathematics vocabulary (Wright & Neuman, 2009). Participating in interesting and appropriately challenging mathematical activities allows children to develop a deep understanding of mathematics concepts and to use problem-solving skills to stretch their mathematical thinking. Wright and Neuman provide the example where a child uses the word big to mean an object is long, tall, or heavy. Generalized use of the term big may be due to an inadequate vocabulary, requiring explicit instruction and practice with appropriate activities. Young children are capable of learning appropriate mathematical vocabulary when teachers intentionally teach, explaining the correct terms, and offer regular opportunities to learn and practice as part of the curriculum.

The practices of scientific inquiry as well as foundational knowledge in science should be part of the preschool curriculum as a key content area (Wright & Neuman, 2009). Science comes naturally to children because they have a natural curiosity about their world and have already formed a set of ideas about how they think things work in the world when starting preschool. According to Michaels, Shouse, and Schweingruber (2008), young children begin school with rich knowledge of the natural world; the ability to reason; an understanding of the principles of cause and effect; foundations for modeling; the ability to consider ideas and beliefs; and an eagerness to participate in learning.

Wright and Neuman (2009) suggest it is “essential that children are introduced to scientific reasoning and concept knowledge in the preK years, thus developing the foundations for science literacy and for future academic success” (p. 20). The suggested areas for scientific accomplishments, made by Michaels, et al. and Wright and Neuman, for preschool children include the areas of physical science (e.g., exploring things that move and change, understanding changes in materials, and cause and effect relationships), life science (e.g., learning about the animal world, body parts, the difference between living and nonliving things), earth science (e.g., recognizing the seasons of the year, different types of weather, showing respect for the environment), and scientific inquiry (e.g., use senses to make observations, use tools to gather information, make predictions based on previous experience and background knowledge).

Social studies originally emerged as a way of educating good citizens through the use of techniques from social science, including “raising questions and gathering, analyzing, discussing, and displaying data” (Mindes, 2005, p. 1). The big ideas for preschool through primary years are related to self, family, and community. So, social studies in preschool can “support children as they solve classroom and school issues as well as investigate neighborhood and community problems with the goal of enhancing understanding and civic awareness and pride” (Mindes, 2005, p. 3). The focus includes decisions about honesty, fairness, courtesy, and respect for others in the classroom and beyond.

In *We Can Early Learning Curriculum*, instruction and guided practice in developing number sense and other essential math concepts, science concepts, and social studies concepts take place in whole-class and small-group activities as well as being reinforced during productive play in Learning Centers. Mathematics, science, and social studies instruction and activities are part of the daily lessons in *We Can Early Learning Curriculum*. The Weekly Planner identifies goals that are part of the instruction, making it easier for the teacher to get a general sense of what will be accomplished during that week.

**Mathematics instruction addresses the following areas:**

- Pre-number concepts—This includes sorting, classifying, ordering, and completing patterns. Instruction focuses on comparing objects and classifying them by different attributes to help children learn to classify and sort objects into sets, which can then be counted and compared for more, less, same, and equal.
- Number concepts—This area includes developing a sense of one-to-one correspondence as children learn to count objects using the additive principle of increasing the number of objects. Children learn that the last number in a set tells the quantity of objects in the set, and the number of objects in a set does not change with the rearrangement of the objects.
- Geometry concepts—This area includes knowing that solids and shapes have properties and that shapes can be observed and described in relation to one another. Children learn that plane shapes can have sides and corners and that shapes can be sorted by their properties.
- Measurement concepts—Children learn to compare objects and then to order objects by length, weight, and capacity. As children progress in this area, they learn to measure length, weight, and capacity using nonstandard units.
- Data concepts—Children learn graphing as a way to organize and show information. Children sort and classify real objects to form graphs and progress to reading and interpreting picture and bar graphs.

**Science instruction includes the following domains:**

- Scientific inquiry—Teachers help children understand how to use their senses and other tools (e.g., scales for weighing) to observe and draw conclusions about their world. Children learn to collect information and organize that information. Children learn to make predictions based on previous experience and to explain those predictions.
- Vocabulary and conceptual knowledge are enhanced and expanded through instruction in the following domains:
  - Physical science—Along with other areas, children learn about colors, different objects and their properties, textures, and what makes objects the same and different. Children also learn to use their senses and other tools (e.g., magnifying glass) to gather information about their world. Children experiment with different objects to see how they move and change under different conditions.
  - Life science—Children are exposed to many life science topics including plants, insects, food groups, healthy food choices, energy, matter, and animals, to name a few. Children explore the life cycles of animals, plants, insects, and people. Children compare the similarities and differences between different groups.
  - Earth science—Teachers lead discussions about the weather, the changes in weather, and what those changes may mean in terms of what clothing to wear. Children learn about the seasonal changes and understand how that affects what people do and the choices they make. Children learn about protecting the environment.

**Social studies instruction includes the following domains:**

- Self—Children learn school rules and routines, to understand that routines can be similar in different environments such as home or school, how a child’s actions have certain consequences, and how to handle conflicts.
- Families and community—Children learn about characteristics that make people similar; how to be a friend and cooperating with others; what makes families similar and unique; the basic needs all people have, such as needing food and water, and how that is similar and different from animals’ needs; and about different cultures and the different ways families celebrate holidays.
- Citizenship—Children learn about assuming responsibility and being a helper, roles and responsibilities of community helpers, voting and that voting is one way to make a group decision, how money is used and that money can be represented by different formats.
- Environment—Children learn about the seasonal changes and weather and how that affects people’s habits; the basic needs of people, animals, and plants; maps and globes and their purposes; and about ways to protect the environment by conserving and recycling.

*We Can Early Learning Curriculum* carefully integrates mathematics, science, and social studies topics into the daily lessons so they are interwoven and support each other, where appropriate, through the thematic units. Children are given the opportunities to explore their world through carefully selected and integrated activities, allowing for experimentation and discovery to take place.

## Summary

The research discussed in this research foundation guided the revision and enhancement of *We Can Early Learning Curriculum*. Since the creation of the original *We Can! Early Childhood Curriculum*, standards have changed to include more rigor and information that children need to know prior to entering kindergarten. Revising the original curriculum enabled the incorporation of recent research, best practices for improving instructional effectiveness, additional skills and activities to meet new and revised standards, and aligning with the expectations for kindergarten children in the CCSS.

*We Can Early Learning Curriculum* responds to and embodies current research on what preschool children need in terms of a curriculum to be ready to learn at the beginning of kindergarten. The importance of children being ready to learn in kindergarten is not a new idea. It is now recognized that children need to be ready, not only with social and emotional abilities but cognitive skills as well, at the beginning of kindergarten to make the most of their first formal schooling experience. *We Can Early Learning Curriculum* responds to the recognized importance of building children’s foundational skills prior to kindergarten.

*We Can Early Learning Curriculum* provides a systematic and purposeful blend of these skills, recognizing that children arrive at preschool with different levels of abilities for which accommodations need to be made. The goal of *We Can Early Learning Curriculum* is to develop competent and confident learners who make responsible choices for self-regulation, desire to learn more and communicate their ideas, transform informal understanding of their world into more formal mathematics and science concepts, and demonstrate developmental readiness for actively participating in learning experiences.

## References

- Anthony, J. L., Lonigan, C. J., Driscoll, K., Phillips, B. M., & Burgess, S. R. (2003). Phonological sensitivity: A quasi-parallel progression of word structure units and cognitive operations. *Reading Research Quarterly, 38*, 470-487.
- Baghban, M. (2007). Scribbles, labels, and stories: The role of drawing in the development of writing. *Young Children, 62*(1), 20-26.
- Bowman, B., Donovan, M., & Burns, M. (Eds.). (2001). *Eager to learn: Educating our preschoolers*. Washington, DC: National Academy Press.
- Daily, S., Burkhauser, M., & Halle, T. (2010). A review of school readiness practices in the states: Early learning guidelines and assessments. *Child Trends: Early Childhood Highlights, 1*(3), 1-12.
- Denham, S. A., & Brown, C. (2010). "Plays nice with others": Social-emotional learning and academic success. *Early Education & Development, 21*(5), 652-680.
- Diamond, K. E., Justice, L. M., Siegler, R. S., & Snyder, P. A. (2013). *Synthesis of IES research on early intervention and early childhood education* (NCSER 2013-3001). Washington, DC: National Center for Special Education Research, Institute of Education Sciences, U.S. Department of Education.
- Downer, J. T., & Pianta, R. C. (2006). Academic and cognitive functioning in first grade: Associations with earlier home and child care predictors and with concurrent home and classroom experiences. *School Psychology Review, 35*(1), 11-30.
- Duncan, G. J., Claessens, A., Huston, A. C., Pagani, L. S., Engel, M., Sexton, H., ... Japel, C. (2007). School readiness and later achievement. *Developmental Psychology, 43*(6), 1428-1446.
- Early, D. M., Maxwell, K. L., Burchinal, M., Alva, S., Bender, R. H., Bryant, D., ... Zill, N. (2007). Teachers' education, classroom quality, and young children's academic skills: Results from seven studies of preschool programs. *Child Development, 78*(2), 558-580.
- Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH, DHHS. (2010). *Developing early literacy: Report of the national early literacy panel* (NA). Washington, DC: U.S. Government Printing Office.
- Foorman, B. R., Anthony, J., Seals, L., & Mouzaki, A. (2002). Language development and emergent literacy in preschool. *Seminars in Pediatric Neurology, 9*(3), 173-184.
- Frede, E., & Ackerman, D. J. (2007). *Preschool curriculum decision-making: Dimensions to consider*. New Brunswick, NJ: National Institute for Early Education Research.
- Ginsburg, H. P., Lee, J. S., & Boyd, J. S. (2008). Mathematics education for young children: What it is and how to promote it. *Social Policy Report, 22*(1), 3-23.
- Hart, B., & Risley, T. R. (2003). The early catastrophe: The 30 million word gap by age 3. *American Educator, 27*, 4-9.
- Hougen, M. C., & Smartt, S. M. (Eds.). (2012). *Fundamentals of literacy instruction and assessment Pre-K-6*. Baltimore, MD: Brookes.
- Kuhl, P. K. (2004). Early language acquisition: Cracking the speech code. *Nature Reviews Neuroscience, 5*(11), 831-843.
- Lonigan, C. J. (2006). Development, assessment, and promotion of preliteracy skills. *Early Education and Development, 17*(1), 91-114.
- Michaels, S., Shouse, A.W., & Schweingruber, H.A. (2008). *Ready, set, science! Putting research to work in K-8 science classrooms*. Board on Science Education, Center for Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
- Mindes, G. (2005). Social studies in today's early childhood curricula. *Young Children, 60*(5), 12-18.



- Moats, L. C. (2000). *Speech to print: Language essentials for teachers*. Baltimore, MD: Brookes.
- National Association for the Education of Young Children. (2009). *Developmentally appropriate practice in early childhood programs serving children from birth through age 8* [Position statement]. Washington, DC: Author.
- National Association for the Education of Young Children and National Association of Early Childhood Specialists in State Departments of Education. (2003). *Early childhood curriculum, assessment, and program evaluation: Building an effective, accountable system in programs for children birth through age 8* [Position statement]. Washington, DC: Author.
- National Association for the Education of Young Children and National Council of Teachers of Mathematics. (2002). *Early childhood mathematics: Promoting good beginnings* [Position statement]. Washington, DC: Author.
- National Council of Teachers of Mathematics. (2007). *What is important in early childhood mathematics?* [Position statement]. Reston, VA: Author.
- National Governors Association Center for Best Practices and Council of Chief State School Officers. (2010). *Common Core State Standards*. Washington, DC: Author.
- Piasta, S. B., Petscher, Y., & Justice, L. M. (2012). How many letters should preschoolers in public programs know? The diagnostic efficiency of various preschool letter-naming benchmarks for predicting first-grade literacy achievement. *Journal of Educational Psychology, 104*(4), 945-958.
- Piasta, S. B., & Wagner, R. K. (2010). Developing early literacy skills: A meta-analysis of alphabet learning and instruction. *Reading Research Quarterly, 45*(1), 8-38.
- Preschool Curriculum Evaluation Research Consortium. (2008). *Effects of preschool curriculum programs on school readiness* (NCER 2008-2009). Washington, DC: National Center for Education Research, Institute of Education Sciences, U.S. Department of Education. Washington, DC: U.S. Government Printing Office.
- Puranik, C. S., & Lonigan, C. J. (2011). From scribbles to scrabble: Preschool children's developing knowledge of written language. *Reading and Writing, 24*(5), 567-589.
- Schickedanz, J. A., & Collins, M. F. (2013). *So much more than the ABCs: The early phases of reading and writing*. Washington, DC: National Association for the Education of Young Children.
- Takanishi, R., & Kauerz, K. (2008). PK inclusion: Getting serious about a P-16 education system. *Phi Delta Kappan, 89*(7), 480-487.
- U.S. Department of Health and Human Services. (2010). *The Head Start child development and learning framework: Promoting positive outcomes in early childhood programs serving children 3-5 years old*. Washington, DC: Author.
- Whitehurst, G. J., & Lonigan, C. J. (1998). Child development and emergent literacy. *Child Development, 69*(3), 848-872.
- Wright, T. S., & Neuman, S. B. (2009). *Preschool curriculum: What's in it for children and teachers*. Washington, DC: Albert Shanker Institute.