



AP PHOTO/CHARLIE NEBERG/ALL

# Examining Quality Across the Preschool-to-Third-Grade Continuum

---

By Danielle Ewen and Rachel Herzfeldt-Kamprath January 2016



# Examining Quality Across the Preschool-to-Third- Grade Continuum

---

By Danielle Ewen and Rachel Herzfeldt-Kamprath January 2016

# Contents

<b>1</b>	<b>Introduction and summary</b>
<b>3</b>	<b>Background</b>
<b>5</b>	<b>What ECLS data reveal about preschool quality</b>
<b>11</b>	<b>Classroom experiences between preschool and third grade</b>
<b>25</b>	<b>Recommendations to improve quality and alignment</b>
<b>31</b>	<b>Conclusion</b>
<b>32</b>	<b>Appendix A</b>
<b>33</b>	<b>Appendix B</b>
<b>34</b>	<b>Appendix C</b>
<b>36</b>	<b>Appendix D</b>
<b>39</b>	<b>Endnotes</b>

# Introduction and summary

For the past several decades, U.S. policymakers at every level have highlighted the need to close the educational achievement gaps between racial and socioeconomic groups. One much-needed improvement is better alignment across the preschool-to-third-grade continuum. Knowing that gaps begin before children enter kindergarten, understanding what children experience as they enter their formal education is vital in order to inform policies that can improve alignment across the early learning and K-12 education systems and ultimately support better outcomes for all children.

Given the important foundation that the earliest years of life establish for children's long-term success, this report seeks to understand whether they are getting the support and quality experiences they need in early childhood programs and early elementary classrooms—namely, in kindergarten, first grade, and second grade. Using nationally representative data to examine children's experiences in the early years of their education, this report asks two key questions. First, to what extent are children accessing high-quality early education by race and socioeconomic status? And second, once children reach elementary school, does exposure to quality classrooms with teaching practices that build on and strengthen that early foundation vary for children from different racial and socioeconomic backgrounds?

The answers to these questions reveal the gaps in access to quality early childhood programs and highlight the need for improvements in teacher preparation and ongoing training. The data also highlight the lack of common measures of quality across early childhood programs and early elementary experiences and the need for better alignment across the preschool-to-third-grade continuum. For this reason, the report's research is presented in two sections. The first section describes access to quality early education programs; the second examines if current teaching practices provide regular exposure to the skills identified within state standards at each grade level. The two sections of the report show that:

- Access to high-quality early childhood education is limited and varies by program type and a child’s racial and socioeconomic background. Specifically, among children with access to center-based prekindergarten programs, Hispanic children are more likely to access high quality than black children, and children from middle-income families have the least access to high quality.
- Measures of quality in early childhood and those in early elementary school are not similar or aligned.
- In early elementary grades—kindergarten through second grade—teachers appear to spend less time developing the higher-order thinking skills that are critical for school success, despite the high expectations outlined in state education standards.

As federal, state, and local policymakers debate next steps in aligning the nation’s early childhood education systems and policies, the following recommendations should be considered:

- Expand access to high-quality early education by increasing investments at the federal, state, and local levels
- Create aligned quality standards between early childhood programs and third grade and develop consistent metrics and data systems to track access to quality between these years
- Ensure that teacher preparation programs and professional development opportunities incorporate information about children’s development in all domains to support higher-order skill building

Continuous access to high-quality learning environments and experiences between preschool and third grade would better support children’s early development and contribute to success in their academic career and beyond.

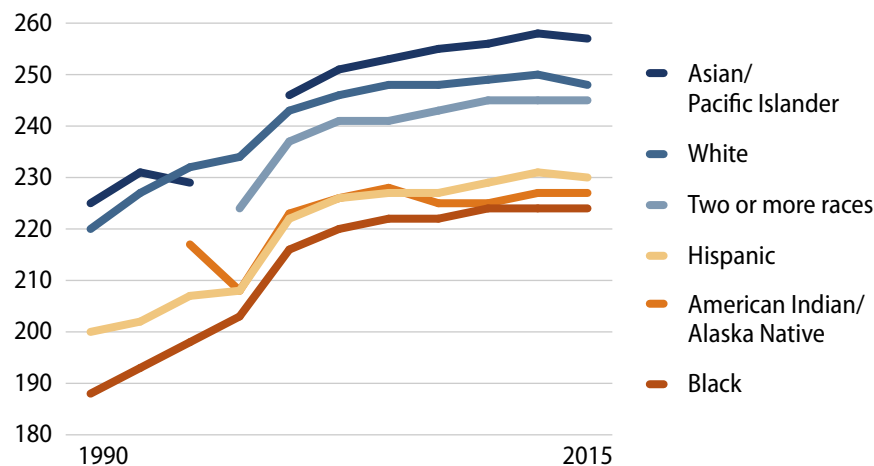
# Background

Data from the National Assessment of Educational Progress, or NAEP—which examines student proficiency in reading and math—shows that while progress has been made, significant racial gaps in test scores still exist. In 2015, NAEP data showed an overall increase in scores compared to the first assessment in the early 1970s: “In both reading and mathematics at all ... ages, Black students made larger gains from the early 1970s than White students,” and “Hispanic students made larger gains from the 1970s than White students in reading at all ... ages and in mathematics at ages 13 and 17.”<sup>1</sup> Yet, as Figure 1 demonstrates, gaps still remain between white and Asian children and other racial groups.<sup>2</sup>

**FIGURE 1**

## Gaps in educational achievement persist by children's race and ethnic background

Trend in fourth-grade NAEP mathematics average scores, by race and ethnicity, 1990–2015



Note: The Institute of Education Sciences dataset does not include data on Asian/Pacific Islander children's achievement in 2000, American Indian/Native American children's achievement in 1990 and 1992, and the achievement of children of two or more races in 1990, 1992, and 1996.

Source: Mathematics assessments from Institute of Education Sciences, *National Assessment of Educational Progress* (U.S. Department of Education, 1990, 1992, 1996, 2000, 2003, 2005, 2007, 2009, 2011, 2013 and 2015), available at [http://nces.ed.gov/nationsreportcard/naepdata/report.aspx?p=1-MAT-2-20153,20133,20113,20093,20073,20053,20033,20003,20002,19963,19962,19922,19902-MRPCM-SDRAC E-NT-MN\\_MN-Y\\_J-0-0-5](http://nces.ed.gov/nationsreportcard/naepdata/report.aspx?p=1-MAT-2-20153,20133,20113,20093,20073,20053,20033,20003,20002,19963,19962,19922,19902-MRPCM-SDRAC E-NT-MN_MN-Y_J-0-0-5).

These gaps are evident from the earliest stages of life, particularly among disadvantaged children. Cognitive disparities, for example, are evident at age 9 months, with significant gaps noticeable at 24 months.<sup>3</sup> By the time children enter kindergarten at age 5, only 48 percent of poor children are ready for school, compared with 75 percent of moderate- or high-income children.<sup>4</sup> Among poor children, 30 percent score low on reading readiness and 26 percent lack readiness in math skills.<sup>5</sup>

Researchers have long understood that high-quality early childhood education can help close school-readiness gaps. Studies of the statewide pre-K programs in Georgia and Oklahoma and the Boston Public Schools' Department of Early Childhood have demonstrated that children with access to high-quality early childhood education make substantial gains during their pre-K year.<sup>6</sup> Additional research from the HighScope Perry Preschool Study, Chicago Child-Parent Centers, and Carolina Abecedarian Preschool has shown that high-quality programs have lasting effects later in school, including decreases in grade retention and special education placement,<sup>7</sup> and in life, from a reduced need for public assistance to lower crime rates and higher earnings.<sup>8</sup>

In other words, a substantial body of research has long demonstrated that preschool closes school-readiness gaps—if it is high quality. In addition, research has shown that children from low-income communities are more likely to attend elementary schools with fewer dimensions of high quality, minimizing the effect of high-quality early childhood programs and contributing to achievement gaps.<sup>9</sup>

To close these gaps, children must have access to high-quality, aligned programs between their preschool years and third grade. To help children succeed, classrooms in each year of the preschool-to-third-grade continuum should incorporate all elements of quality, as well as be designed to promote children's development and support higher-order skills in literacy and math while growing social and emotional skills. Yet the lack of common quality measures and approaches to teaching and learning across the preschool-to-third-grade continuum means that for many young children—especially those with multiple risk factors—the promise of a high-quality experience fails to materialize.

# What ECLS data reveal about preschool quality

The most recent Early Childhood Longitudinal Study-Birth Cohort, or ECLS-B, data provide a snapshot of who has access to quality preschool nationally, with a focus on how quality differs by program type, race, and income. These data suggest that despite increased public spending and tighter policy regulations, program quality remains mediocre for most children enrolled in center-based early childhood programs in the United States. As a result, too many children enter kindergarten unprepared, lagging far behind their more school-ready peers.<sup>10</sup>

In the following sections, quality is assessed using the Early Childhood Environment Rating Scale-Revised, or ECERS-R. The ECERS has long been the standard, most commonly used comprehensive observational measure of quality for preschool classroom environments. It combines 43 items that measure classroom environment, including space and furnishings, personal care routines, language reasoning, activities, interactions, program structure, and parents and staff. The ECERS rating falls on a scale of 1 to 7, with 1 indicating inadequate quality, 3 indicating minimal quality, 5 indicating good quality, and 7 indicating excellent quality.<sup>12</sup> Dozens of investigations have demonstrated an association between higher scores on ECERS observations and children's developmental outcomes.<sup>13</sup>

---

## Quality by program type

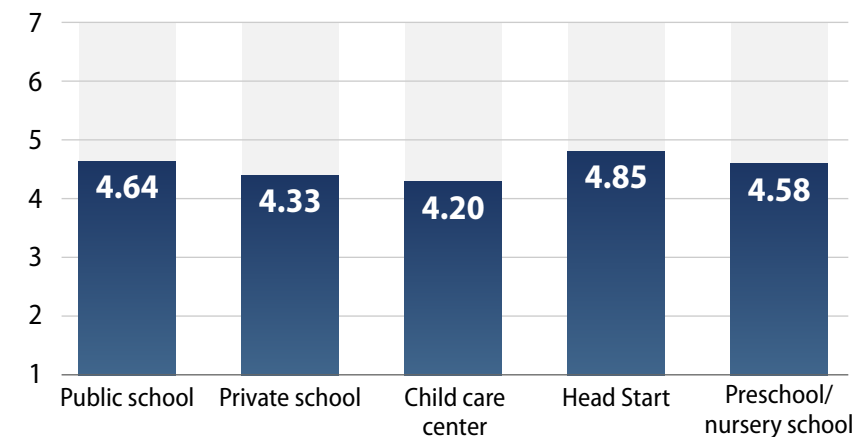
Overall, ECLS-B data show that most children enrolled in an early childhood program are in one rated between minimal quality and good quality by the ECERS, as shown in Figure 2. However, income and race can create varying access to the highest-quality programs. Of the five types of early childhood education programs identified in the ECLS-B—including public school programs, private school programs, child care centers, Head Start programs, and preschool and nursery programs—ECERS scores show that Head Start programs rate highest of all program types, with an average score just below the 5-point level of good quality on the ECERS scale.

### The Early Childhood Longitudinal Study

The ECLS is a program of the U.S. Department of Education that includes three longitudinal studies designed to be nationally representative of the cohorts of children surveyed. The studies were constructed to examine children's early educational experience, as well as their developmental progress, school readiness, and school achievement.<sup>11</sup> This report looks at data from the birth cohort, or ECLS-B, which was collected between 2001 and 2008, and the kindergarten cohort update, or ECLS-K, which began collecting data in 2011 and is ongoing. Each data set is the most recently available of its kind. For more information on the data, see Appendix D.

FIGURE 2

Average ECERS score by program type



Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Birth Cohort* (U.S. Department of Education, 2009).

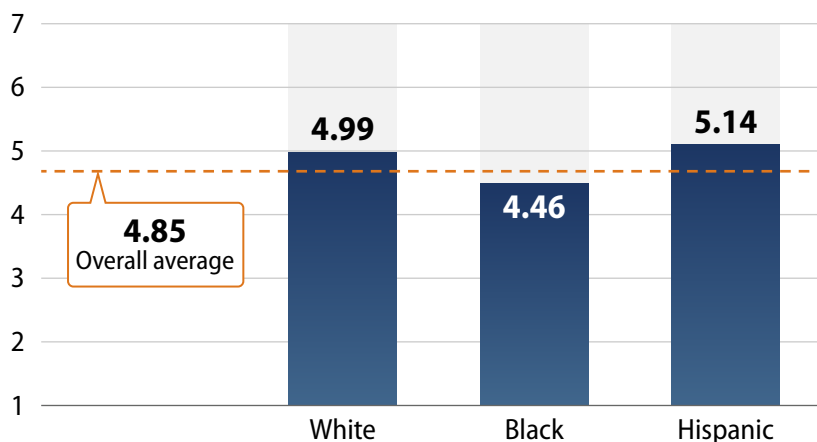
These findings align closely with previous multistate studies on early childhood education quality that used ECERS, including the 1995 “Cost, Quality, and Child Outcomes Study”<sup>14</sup> and the National Institute of Child Health and Human Development’s 1998 “Study of Early Child Care and Youth Development.”<sup>15</sup>

### Access to quality for children in Head Start

While ECERS data in the ECLS-B data set suggest that Head Start provides the highest-quality early education on average, analysis shows that this is not true for all children. Figure 3 shows that, of all racial groups, black children typically have access to the Head Start programs that receive the lowest ECERS scores compared with their white and Hispanic peers, although Head Start does provide some of the highest-quality care available to black children. For white and Hispanic children, Head Start programs remain the highest-quality programs on average.<sup>16</sup>

FIGURE 3

### Average ECERS score for children in Head Start programs by race

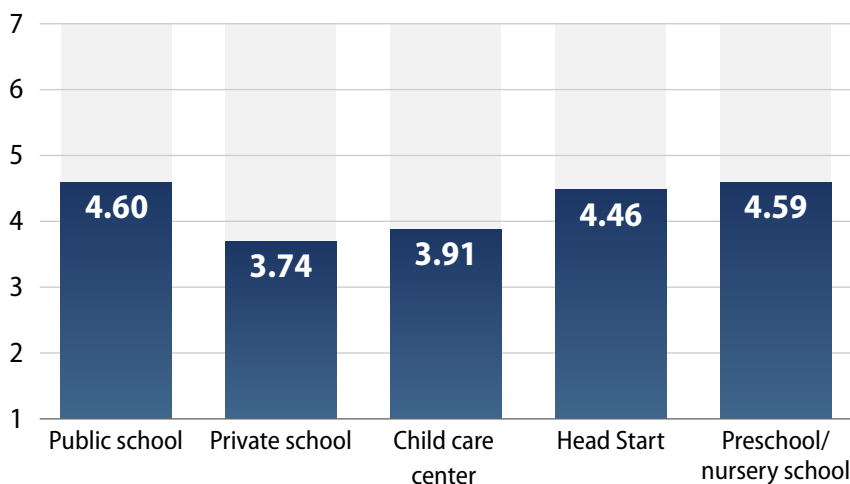


Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Birth Cohort* (U.S. Department of Education, 2009).

In fact, unlike other racial groups, African American children are most likely to access high-quality early childhood programs if they are in public pre-K or preschool and nursery school programs. Head Start programs serving African American children are not providing the lowest quality available to this population, but this finding is particularly disconcerting considering that African American children represent nearly one-third of the Head Start population.<sup>17</sup>

FIGURE 4

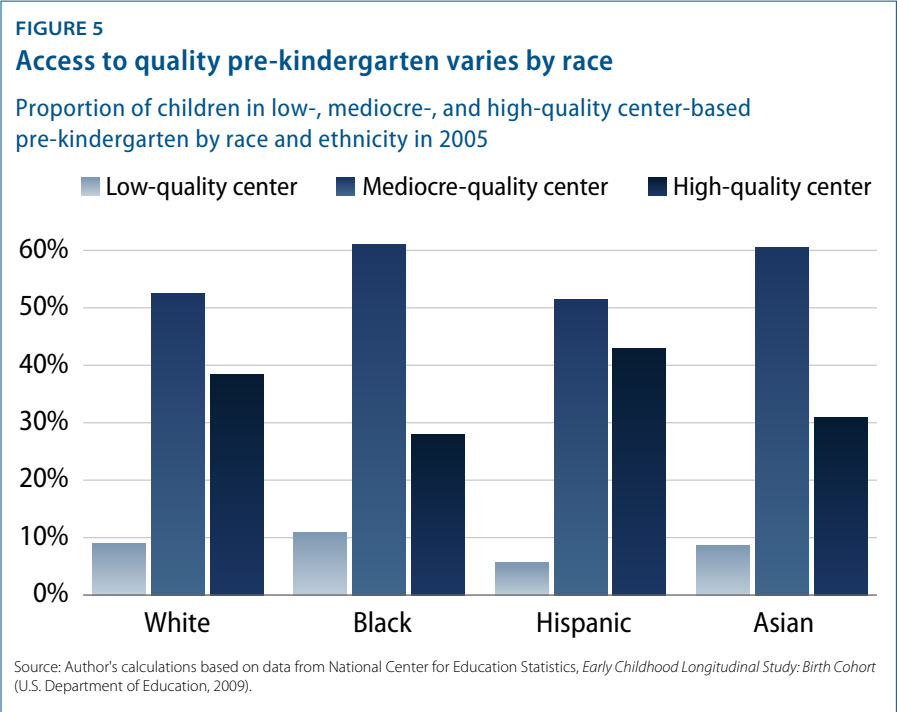
### Average ECERS score by program type for African American children



Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Birth Cohort* (U.S. Department of Education, 2009).

Access to quality early childhood programs by children’s race or ethnicity

The ECERS scale considers programs to be low quality if they are rated less than 3 on the scale, mediocre quality if they are between 3 and 5, and high quality if they are more than 5. This provides a scale to examine which children have access to high- and low-quality programs. Using this scale, ECLS-B data reveal that regardless of race or ethnicity, most students are enrolled in an early childhood education program that only meets mediocre quality standards, as defined by the ECERS. Comparing access to center-based early education by children’s race and ethnicity reveals that most children are in mediocre-quality settings.

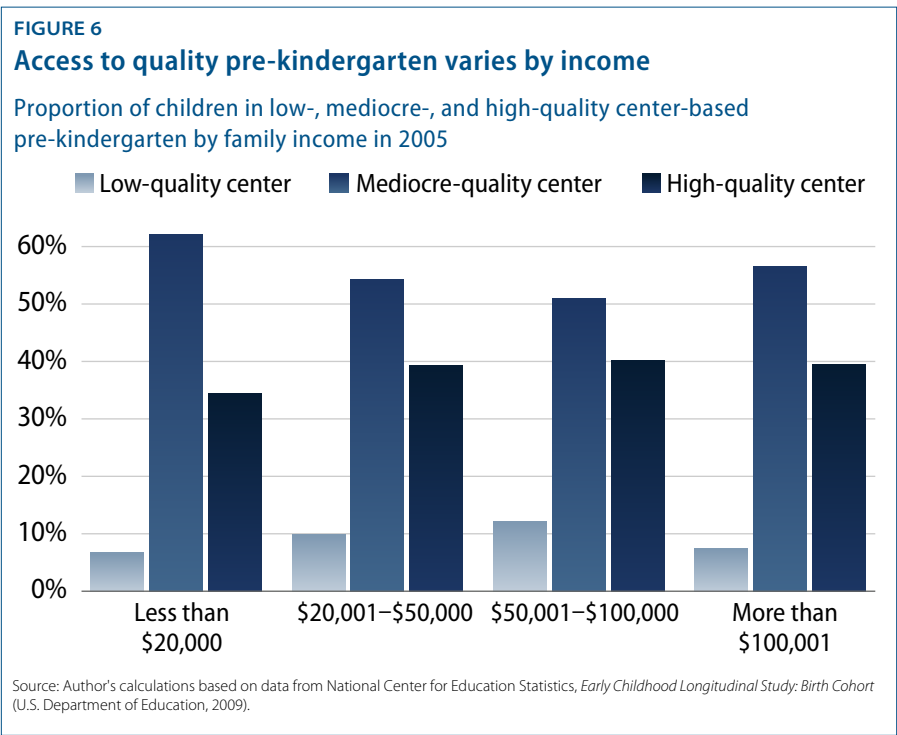


A closer look at access to center-based care shows that Hispanic children are the most likely to be in high-quality settings, followed closely by their white peers. Meanwhile, black children are the least likely to be in high-quality settings and, worse yet, most likely to be in low-quality early childhood programs. Ten percent of black children are in low-quality programs—a higher proportion than Asian, Hispanic, and white children. Other researchers have confirmed this trend.<sup>18</sup>

## Access to quality early childhood programs by family income

The ECLS-B data also show that access to quality varies by a child's household income, with roughly half of the children in each income quartile attending mediocre-quality programs. Data suggest that children from the lowest-income households are the least likely to be in high-quality early childhood settings. This is particularly concerning because fewer than 50 percent of poor children are school ready by age 5, and they stand to gain the most from high-quality early education.<sup>19</sup>

Interestingly, this analysis shows that moderate-income children are most likely to be in low-quality programs. This finding is not new—several studies have found that lower-middle-income families have less access to quality care than children from low-income families. This is likely due to the availability of programs such as Head Start or other publicly funded pre-K programs that are generally targeted toward low-income families.<sup>20</sup>



While it is well known that high-quality early childhood experiences matter for children, data suggest that few children actually access these opportunities and that children from poor backgrounds and children of color are the least likely to have them. Thus, many children start their experience in the public education system already behind. Lack of access to high-quality early childhood education is a key barrier to improving quality across the preschool-to-third-grade continuum and improving achievement at the third-grade level.

# Classroom experiences between preschool and third grade

Reflecting broader research and practice inconsistencies on how to define and measure effective education settings across the preschool-to-third-grade continuum, the ECLS-K does not provide a global measure of quality in the same way as the ECLS-B. Analysis in the following section examines the frequency of teaching practices that facilitate skill development at each grade level from preschool to second grade. While teaching practices are not a measure of quality, they do give information on whether children have access to high-quality instruction that promotes problem solving, supports the development of higher-level skills, and may help to close achievement gaps.<sup>21</sup>

---

## What do children learn in preschool?

Analysis of ECLS-B data indicates that children enrolled in center-based early childhood programs are frequently exposed to instruction that facilitates the development of important foundational skills. On a weekly basis, more than 90 percent of preschool students spend time learning the names of letters and seeing print while reading, more than 80 percent practice writing, and 89 percent work on writing their own names.<sup>22</sup> Similarly, more than 90 percent of preschool students practice counting out loud at least once per week, and 90 percent use geometric manipulatives.<sup>23</sup>

Teachers in higher-quality early education programs are more likely to provide children with activities and instruction that facilitate the development of skills across a range of domains than teachers in lower-quality programs. Thus, children who have access to high-quality learning environments enter kindergarten far ahead of their peers who did not receive these supports.<sup>24</sup> Based on analyses discussed earlier in this report and other similar studies, children from low-income backgrounds and children of color have less access to high-quality programs, which means they are less likely to receive the supports they need to develop crucial early literacy and numeracy skills. This early disadvantage may put them behind upon entry into kindergarten.<sup>25</sup>

Research suggests that instruction in the early elementary grades may do little to close the gaps. The Center for Advanced Study of Teaching and Learning examined more than 4,000 pre-K, first-, third-, and fifth-grade classrooms, and found that teachers spent much of their time on basic skills building; spent more time on literacy than other skills; and spent up to 30 percent of their time on routines and classroom management.<sup>26</sup> Those early years are key to fostering children's ongoing school success. Thus, it is crucial that young students are exposed to instruction that promotes higher-order thinking and problem solving—not just basic skills and routines—in kindergarten and beyond. The following analyses examines whether or not children are exposed to the skills identified in standards as critical to their development in kindergarten, first grade, and second grade.

---

## What do children learn in kindergarten?

Given the importance of the kindergarten year in identifying and alleviating gaps, it is vital to understand what children should know and be able to do before completing kindergarten and whether evidence suggests that they are reaching these goals. There are a variety of sources that recommend what children should know and be able to do in kindergarten. The National Education Goals Panel,<sup>27</sup> the National Council of Teachers of Mathematics,<sup>28</sup> and, more recently, the Common Core States Standards Initiative developed standards and expectations in English language arts and mathematics skills.<sup>29</sup> Research demonstrates that most children are able to master these skills and that these expectations benefit children,<sup>30</sup> despite claims that standards are too high for young children.<sup>31</sup>

Research finds that at the end of kindergarten, children increased their knowledge of letter sounds, letter-sound relationships at the beginning and end of words, and recognized more sight words. In math, children increased their knowledge of basic numbers and shapes, relative size, and number ordinality.<sup>32</sup> However, the gaps identified at kindergarten entry across racial groups and for children with risk factors continue at the end of kindergarten and widen as children reach the third grade.<sup>33</sup> For this reason, it is important to understand exactly what is being taught to kindergarten students, especially those who may enter kindergarten behind their peers.

English language arts

Early literacy instruction is critical to children’s success. According to researchers at the National Association for the Education of Young Children, this generally means that:

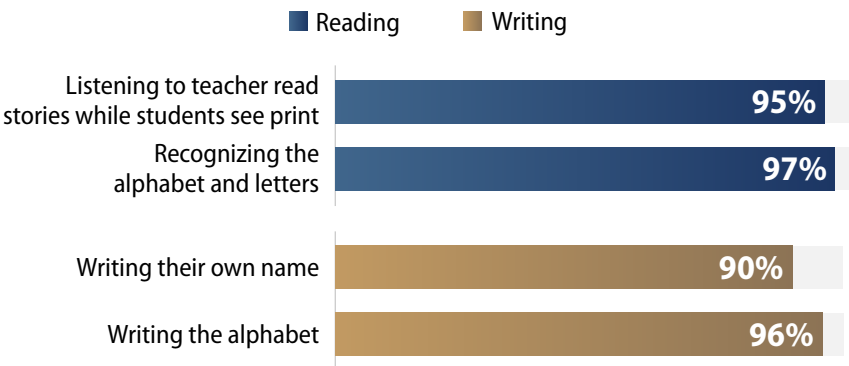
*Children need to learn mainstay concepts and skills of written language from which more complex and elaborated understandings and motivations arise, such as grasp of the alphabetic principle, recognition of basic text structures, sense of genre, and a strong desire to know. They need to learn phonological awareness, alphabet letter knowledge, the functions of written language, a sense of meaning making from texts, vocabulary, rudimentary print knowledge (e.g., developmental spelling) and the sheer persistence to investigate print as a meaning making tool.<sup>34</sup>*

In short, by the end of kindergarten, children are expected to gain knowledge in letters, print recognition, and phoneme awareness; recognize words; begin to read, spell, and write; and demonstrate increased vocabulary and knowledge of the world.

If children are expected to master the components of the standards for English language arts, they need to be exposed to various aspects of language, literacy, storytelling, and vocabulary on a regular basis. The data show that the majority of children in kindergarten receive instruction in these skills at least weekly.

**FIGURE 7**  
**Most kindergarten students receive weekly instruction in key literacy skills**

Percent of kindergarten students who receive such instruction weekly



Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010-11* (U.S. Department of Education, 2011).

While it is encouraging that 90 percent or more of the nation's kindergarten students have teachers who work on these basic skills, additional information demonstrates that children may not have access to the more advanced skills that are also needed to be successful in kindergarten and beyond.

The National Institute for Literacy, or NIFL, recommends that by the end of kindergarten, children should be able to predict what will happen in a story and retell or act out stories.<sup>35</sup> Similarly, according to the Common Core, “with prompting and support, [children should be able to] retell familiar stories, including key details” by the end of kindergarten.<sup>36</sup> And yet, ECLS-K data show that only about half of children in kindergarten, regardless of race and socioeconomic status, receive this important instruction three or more times per week. (see Appendix A)

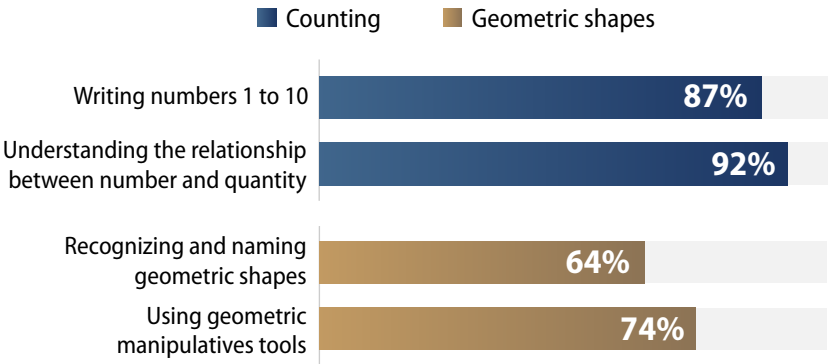
As children learn to explore texts, they are also learning to identify important information. The NIFL notes that by the end of kindergarten, children should be able to use what they know to understand stories, to predict what will happen in the story, and to retell and act out stories. The more recent Common Core standards similarly note that children should, “with prompting and support, identify the main topic and retell key details of a text.”<sup>37</sup> The data suggest that while most children receive instruction in basic literacy skills such as letter recognition, seeing print and hearing stories, and writing letters, a significant portion are not receiving this type of instruction and thereby may not be gaining a deeper understanding of the meaning of print more than three times per week. Such understanding is a necessary building block for developing comprehension skills.

## Math skills

Research shows that early math skills are highly predictive of academic success in both mathematics and reading.<sup>38</sup> Children who start behind in math skills have a hard time making up the gap.<sup>39</sup> Math skills include literacy skills, understanding of numbers and shapes, and the ability to draw inferences and use logic through basic math applications such as addition and subtraction, as well as algebraic and geometric concepts.<sup>40</sup> Nearly all children recognize basic numbers and shapes when they enter kindergarten, and about 60 percent understand relative size.<sup>41</sup> However, previous studies show that black and Hispanic children and low-income children were less likely to demonstrate these skills.<sup>42</sup>

Both the National Council of Teachers of Mathematics, or NCTM, standards and the Common Core emphasize basic counting and understanding shapes. In the introduction to the kindergarten math standards, the Common Core notes, “In Kindergarten, instructional time should focus on two critical areas: (1) representing and comparing whole numbers, initially with sets of objects; (2) describing shapes and space.”<sup>43</sup> Available data show that there is a difference in the instructional time given to these two important areas. While nearly all children in kindergarten receive instruction in writing numbers 1 through 10 and are taught to understand the relationship between numbers and their quantity on at least a weekly basis, one-third of children do not receive regular instruction in shape recognition, and one-quarter are not regularly given the opportunity to work with manipulatives to understand two- and three-dimensional shapes.

**FIGURE 8**  
**Most kindergarten students receive weekly instruction in key math skills**  
Percent of kindergarten students who receive such instruction weekly



Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010-11* (U.S. Department of Education, 2011).

While teachers are clearly spending more time on numbers, there are still areas in which teachers may be missing opportunities to build children’s skills. Regardless of race or poverty level, only about one-third of children are working on counting beyond 100 more than three times per week. A similar pattern is true for other important skills, such as identifying geometric shapes and reading graphs. (see Appendix C) Furthermore, most kindergarten children are not exposed to geometric skills on a regular basis.

Beyond counting and identifying shapes, there are other skills—outlined below and in Appendix A—that help children use information to show relationships between groups of numbers. In kindergarten, data show that few children are exposed to these skills, regardless of race or economic status. Only about one-third of children are being taught to read graphs more than three times per week. Research looking at the same variables corroborates these findings and proves that kindergarten mathematics instruction time tends to focus on skills that students have already mastered rather than expanding children’s knowledge and skills.<sup>44</sup> While it is encouraging to find that access to these skills in kindergarten does not vary much by race or income, it is discouraging that teaching practices seem to focus less on developing higher-order skills that are more predictive of student outcomes at the end of the kindergarten year.<sup>45</sup>

---

## What do children learn in the first and second grades?

Whether children are exposed to and build conceptual knowledge and problem-solving skills in kindergarten matters as they move through school.<sup>46</sup> Research has found that gaps in reading and math skills that exist at kindergarten entry remain into first grade.<sup>47</sup> Furthermore, the skills children build in the first and second grade—when they are learning to read—contribute to their ability to successfully complete third grade, when they move from “learning to read” to “reading to learn.”<sup>48</sup> In “Early Warning! Why Reading by the End of Third Grade Matters,” the Annie E. Casey Foundation notes that “low achievement in reading has important long-term consequences in terms of individual earning potential, global competitiveness, and general productivity.”<sup>49</sup>

In 2000, the National Reading Panel found that successfully teaching children to read encompassed a number of approaches, including phonemic awareness, phonics, fluency, guided oral reading, vocabulary, and reading comprehension strategies, including summarizing material.<sup>50</sup> These are reflected in the Common Core standards for first-grade reading,<sup>51</sup> which include that children should be able to:

- Demonstrate understanding of spoken words, syllables, and sounds (phonemes).
- Distinguish long from short vowel sounds in spoken single-syllable words.
- Orally produce single-syllable words by blending sounds (phonemes), including consonant blends.

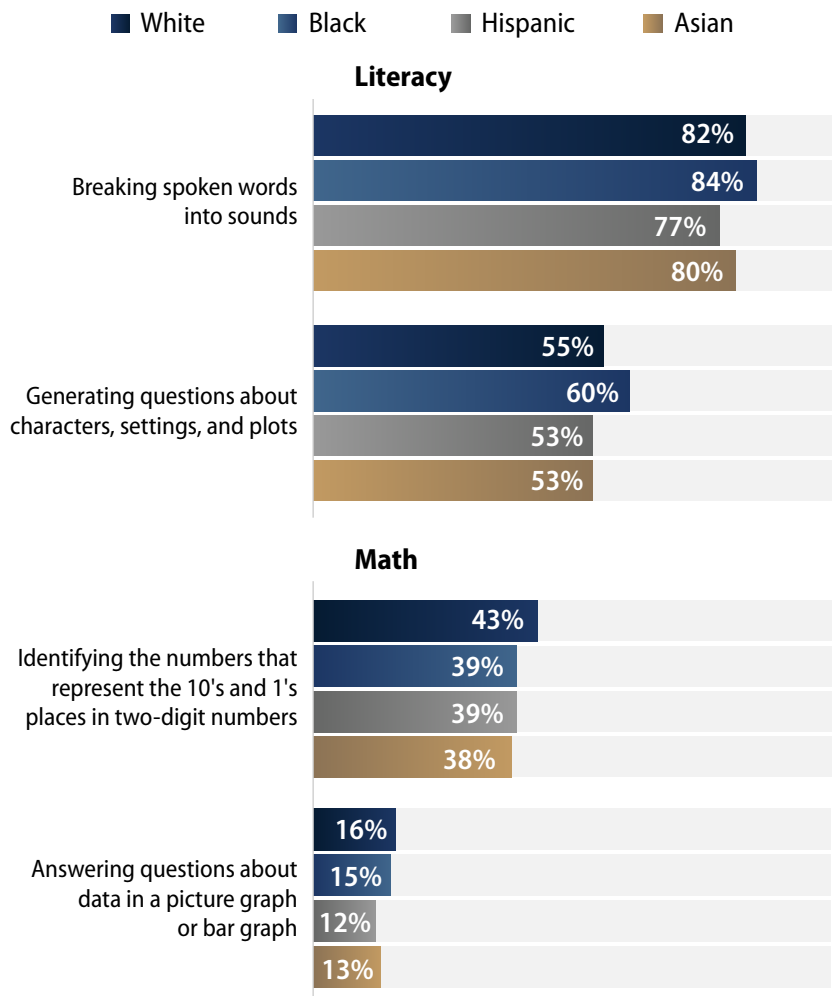
- Isolate and pronounce initial, medial vowel, and final sounds (phonemes) in spoken single-syllable words.
- Segment spoken single-syllable words into their complete sequence of individual sounds (phonemes).
- Ask and answer questions about key details in a text.
- Identify the main topic and retell key details of a text.
- Describe the connection between two individuals, events, ideas, or pieces of information in a text.

First-grade teachers are working to build these skills, yet the data suggest that skills that focus more on comprehension seem to be less prevalent. The data show that more than three-quarters of first-grade children—across all racial and income groups—receive more than 80 days of instruction between the start of school and the spring semester on manipulating phonemes to form new words and breaking words into sounds.<sup>52</sup> Across all groups, only about 6 in 10 children were routinely working on retelling stories, and fewer—slightly more than half—were asked to generate questions about a story’s characters, setting, and plot. In particular, black children and children with the lowest household incomes were the most likely to participate in these activities on a routine basis, although differences between the groups were slight. The focus on phonemic awareness and phonics may lead to challenges down the road, as children need to draw inferences from the text to be successful readers in later elementary school.<sup>53</sup>

FIGURE 9

## First-grade literacy and math teaching practices, by child's race and ethnicity

Percent of children who are taught these skills on more than 80 days by the spring of the school year



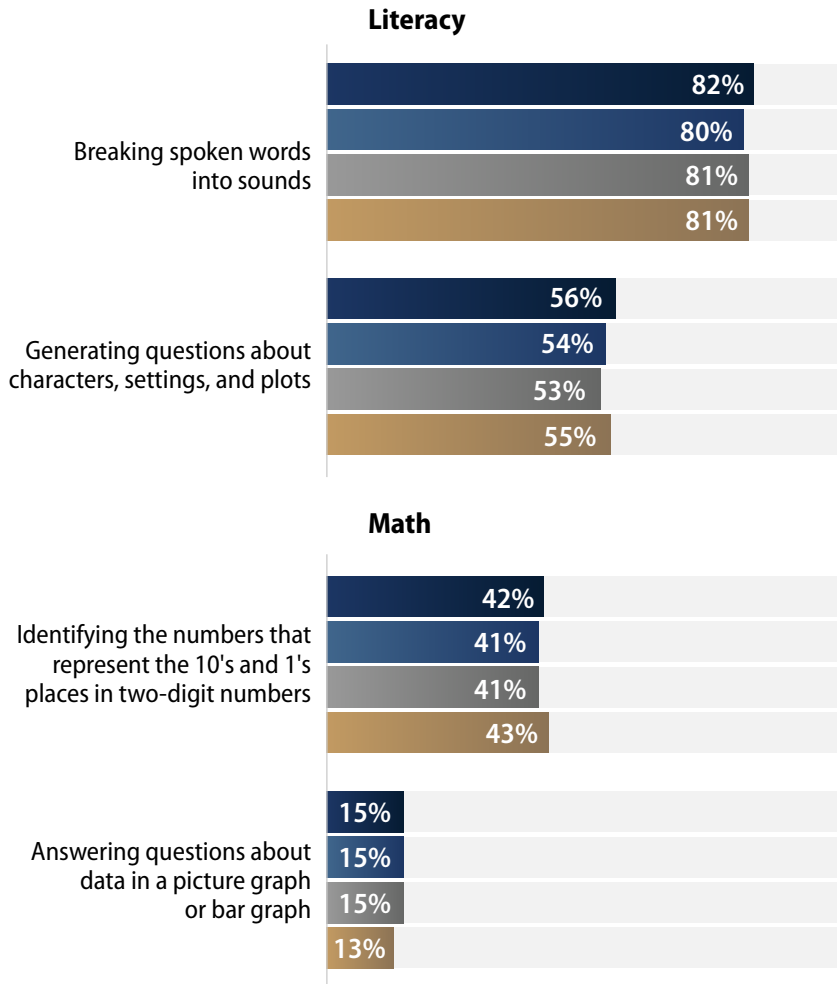
Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010-11* (U.S. Department of Education, 2011).

FIGURE 10

## First-grade literacy and math teaching practices, by family's income

Percent of children who are taught these skills on more than 80 days by the spring of the school year

■ Less than \$20,000 ■ \$20,001–\$50,000 ■ \$50,001–\$100,000 ■ More than \$100,001



Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010-11* (U.S. Department of Education, 2011).

The Common Core standards in math also build on the work in kindergarten. A selection of Common Core standards shows that first-graders are building skills to be able to:<sup>54</sup>

- Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.
- Understand that the two digits of a two-digit number represent amounts of tens and ones.
- Understand that the numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.
- Understand that the numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).
- Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

These skills do not appear to be the norm in first-grade classrooms. Only about one-third of first-graders in any racial or income group are asked to count beyond 100 on more than 80 days in the school year. Even fewer first-graders are asked to read graphs on a regular basis; only about 15 percent of children are asked to answer questions about data in a picture graph or bar graph on more than 80 days in the school year. (see Appendix B)

The data seem to highlight some of the gaps between what children are expected to know and be able to do and how teachers utilize valuable classroom time. Similar to trends identified in kindergarten, first-grade teachers do not seem to be moving children to the more challenging skills needed to understand deeper math concepts. Indeed, as a recent Center for American Progress report noted, teaching more conceptual math is not a new approach, and teaching math in this way improves students' ability to problem solve and master mathematical reasoning.<sup>55</sup>

Similar trends continue into second grade as well. The Common Core identifies a number of English language arts skills that students should be working toward during their second-grade year, including the ability to:<sup>56</sup>

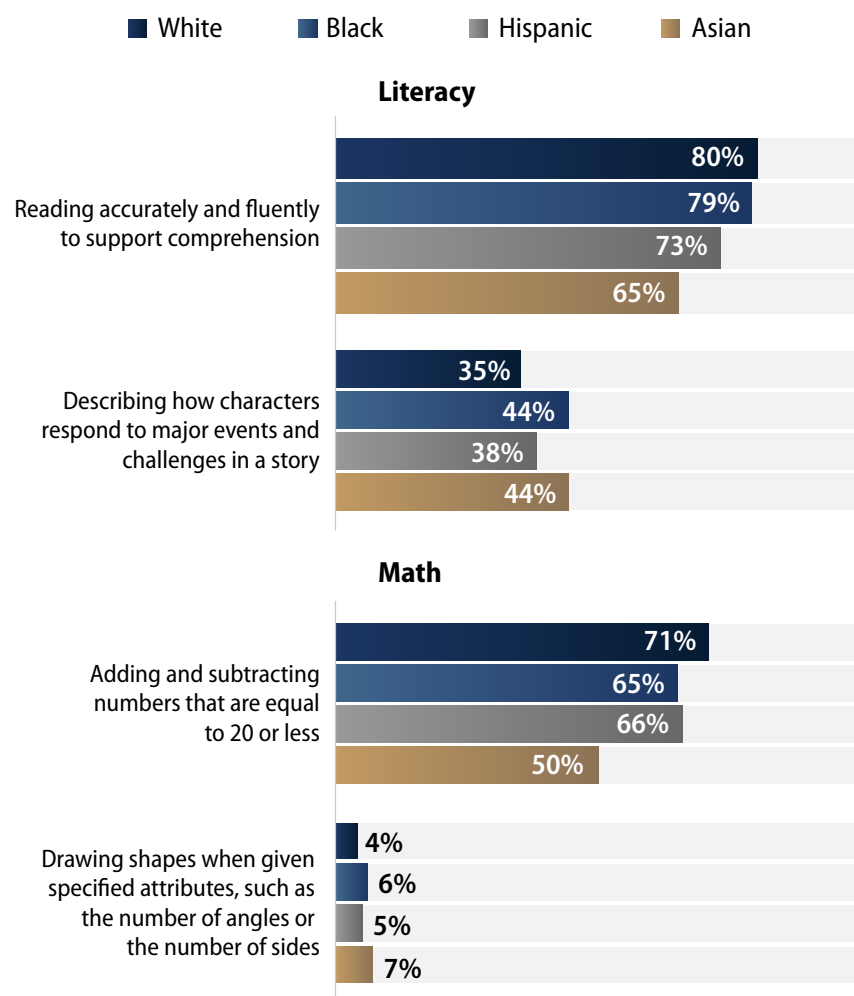
- Describe how characters in a story respond to major events and challenges.
- Describe the overall structure of a story, including how the beginning introduces the story and the ending concludes the action.
- Use information gained from the illustrations and words in a print or digital text to demonstrate understanding of its characters, setting, or plot.
- Distinguish long vowels and short vowels when reading regularly spelled one-syllable words.
- Read with sufficient accuracy and fluency to support comprehension.
- Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.

As children age, they are required to demonstrate more complex literacy and math skills under the Common Core standards. Yet, similar to earlier grade levels, while frequency of instruction does not vary significantly by race or income level, children seem to be underexposed to skills that are more challenging. As the data show, the majority of children—more than three-quarters for all groups except Asian children—routinely read accurately and fluently. However, describing the reaction of characters in a story, using information gleaned from illustrations or text, and writing opinion pieces were much less likely to be part of the daily activity of second-grade students. Roughly one-third of students were routinely exposed to activities in which they described how characters in a story respond to challenges—one way to demonstrate comprehension. Even fewer—6 percent to 15 percent—wrote opinion pieces more than three times per week, even as this activity is a way for teachers to assess vocabulary comprehension and for students to begin organizing information and processing it for an audience.<sup>57</sup>

FIGURE 11

## Second-grade literacy and math teaching practices, by child's race and ethnicity

Percent of children who are taught these skill on more than 80 days by the spring of the school year



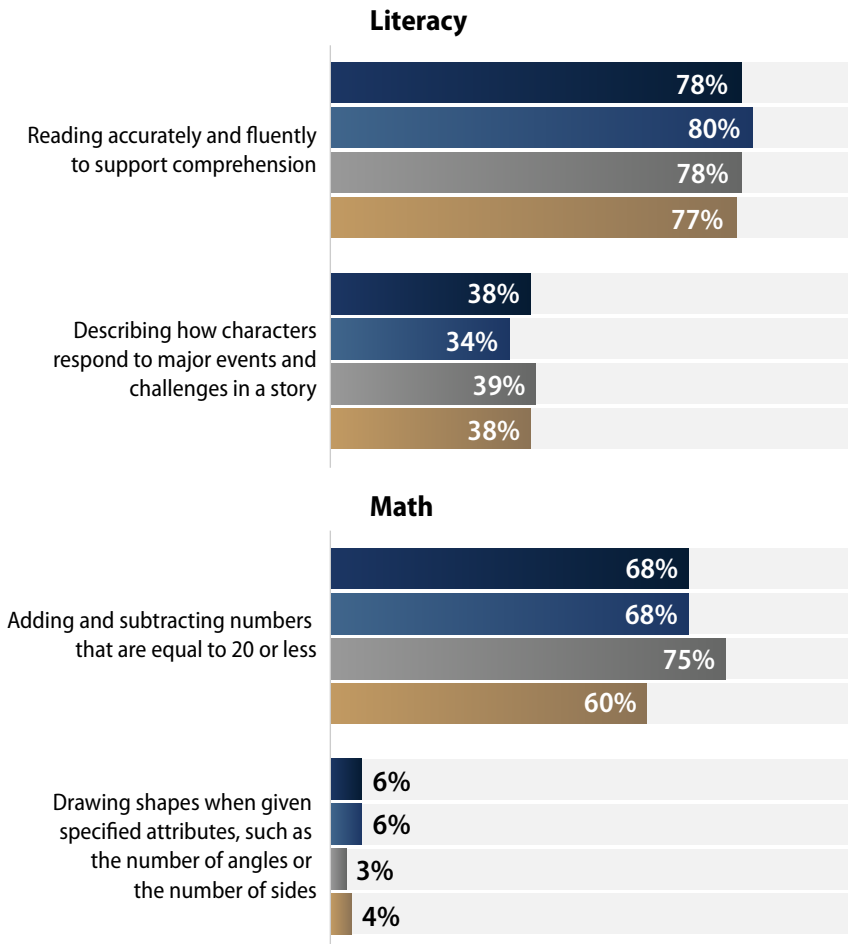
Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010-11* (U.S. Department of Education, 2011).

FIGURE 12

## Second-grade literacy and math teaching practices, by family's income

Percent of children who are taught these skill on more than 80 days by the spring of the school year

■ Less than \$20,000 ■ \$20,001–\$50,000 ■ \$50,001–\$100,000 ■ More than \$100,001



Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010–11* (U.S. Department of Education, 2011).

This pattern is even more pronounced when looking at second-grade math teaching practices. A selection of Common Core standards shows that by the end of the second grade, students should be able to:<sup>58</sup>

- Fluently add and subtract within 20 using mental strategies.
- Know from memory all sums of two one-digit numbers.
- Count within 1,000; skip-count by 5s, 10s, and 100s.
- Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.
- Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.
- Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

Again research shows that while students are generally receiving similar exposure by race and income levels for each skill, children in second grade tend to spend more time developing less-challenging skills—such as simple addition and subtraction—rather than concepts such as measuring, solving word problems, and working with complex geometric shapes. (see Appendix C)

Furthermore, children across all grades from preschool to third grade seem to be spending much less time developing math skills and more time on language, literacy, and readings despite the long-term benefits of early math skills. While the analysis in this paper is limited to examining the frequency of these variables by race and income level, further analysis should explore how these frequencies relate to children's test outcomes and progress over time; how they relate to the skills that children have mastered at the beginning of each school year; and how closely they align with the curriculum that teachers use in each grade.

# Recommendations to improve quality and alignment

The ECLS data provide important information about the learning experiences of young children. These data highlight a number of concerns about access to quality early childhood experiences for poor children, as well as black and Hispanic children. Furthermore, research has shown two important considerations for children during their kindergarten year. First, many children with risk factors enter school behind their peers without such factors. Second, early literacy and math skills predict later school success.

As CAP noted in a 2012 report, “successful transitions from early childhood education programs must begin well before a child starts kindergarten and must continue beyond a child’s enrollment in elementary school.”<sup>59</sup> Yet an analysis of the instructional time during kindergarten shows that many teachers focus on these basic skills and do not spend time building additional skills that are equally important to success. Nor are they building on the foundational skills children have developed in early childhood programs. This could be due to the fact that children are entering kindergarten at different levels of readiness, forcing teachers to spend their time helping some catch up rather than building on existing knowledge. In the first and second grade, there are few differences by race, ethnicity, or income in terms of skill exposure. However, overall skills that require higher-order thinking and put children on the path toward achievement in later grades are not emphasized with the same frequency as more basic skills.

The discrepancies in quality measurement across the data sets also mirrors real-life discrepancies in the way the educational experience is structured from preschool to third grade. In examining access to quality across the preschool-to-third-grade continuum, one of the key challenges identified in this research is the inconsistency in measurement across grades. The understanding of quality in early education centers on teacher and child interactions and environmental quality; in kindergarten and the early years of elementary school, standards focus more on child achievement and what children are expected to know.<sup>60</sup> An analysis of teaching practices and skill building did not present significant differences by race

and income. While this finding may result from data limitations, it points to the need for more and better data measurement. Despite the fact that many kindergarten children are not developmentally different from preschool children, there is a fundamental shift in how the educational experiences of these two age groups are evaluated, making it difficult to examine children's experiences as they move through early education and the K-12 education system.

In response, policymakers should address specific challenges and make a number of important changes to program design and implementation to ensure that all children have access to high-quality settings throughout their early education experiences.

---

### Expand access to high-quality early education by increasing investments at the federal, state, and local levels

**Challenge:** Access to quality is limited, especially for poor children and children of color, across early childhood programs and into early elementary school.

At the federal, state, and local community and school district levels, stakeholders need to identify public and private sources of funding for new and expanded investments in high-quality early childhood programs that meet quality standards for children from birth through the age of school entry. This may include strengthening and expanding Head Start, Early Head Start, and state-funded pre-K, in addition to creating additional opportunities for community-based child care providers, schools, and other programs to partner with these programs. It may also require federal and state partners to identify communities where quality early childhood programs are missing and prioritize investments in those areas.

Expanded investments in programs for young children should include ongoing professional development for all teachers that provides knowledge and information about early learning standards. Moreover, investments should be made in programs that help teachers build important skills in young children that promote preliteracy and math skills, as well as support social and emotional development and physical and mental health development. This is especially important for African American children, who are least likely to have access to high-quality early childhood programs, and Hispanic children, who are less likely to be enrolled in early childhood programs.<sup>61</sup>

In addition, state and local policymakers should expand access to high-quality, full-day and full-year preschool and early learning programs so that all children enter kindergarten with exposure to similar skills across the range of developmental domains. Research has demonstrated the importance of regular and consistent exposure to skill development, especially for children who are most at risk of falling behind in school.<sup>62</sup>

State leaders must build on the foundations created by high-quality early childhood programs by creating universal access to full-day kindergarten. During this important skill-building year, it is difficult for teachers to provide developmentally appropriate learning opportunities in half-day programs. The range of positive outcomes associated with full-day kindergarten includes improved attendance, increased literacy skills, and expanded access to needed interventions for young students.<sup>63</sup>

Furthermore, in order to ensure that the content of early childhood programs builds the foundational skills children need to know and be able to do through third grade and beyond, state and local policymakers should work in partnership to develop aligned early learning and K-12 standards for early elementary programs. These standards should support the full range of academic, social, and emotional development from birth through the third grade.<sup>64</sup> In addition, states and local districts must provide appropriate professional development and supports to teachers to help them understand the standards and scaffold learning opportunities for young children.

---

## Create aligned quality standards and develop consistent metrics and data systems

**Challenge:** Information about program quality and child outcomes in the early grades across the range of domains is not aligned, coordinated, or shared across programs or agencies at the federal, state, and local levels.

In examining access to quality across the preschool-to-third-grade continuum, one of the key challenges is the inconsistency in measurement across grades. Analysis of access to teaching practices and skill building did not present significant differences by race or income. While this may result from data limitations, it points to the need for more and better data measurement, including measures that look at teacher-child interactions in all grades.

State education agencies should create quality standards for early elementary programs—kindergarten to third grade—that reflect best practices in teaching young children and are inclusive of the needs of all children, regardless of income, race, ethnicity, language background, or special needs. Agencies can draw on best practices in early childhood programs, including observational data on teacher-child interactions and environmental ratings, to develop appropriate and aligned measures of quality in kindergarten, first-grade, and second-grade classrooms. These can be paired with content standards that embody both what children should know and be able to do and include supports for teachers, principals, and other school leaders to implement the standards.

State education agencies, or SEAs, should also expand current content standards in both early childhood and early elementary education to support the full range of children’s development and include cognitive, social, emotional, and physical domains. Academic standards alone may not help students develop the skills they need for success in school and beyond.<sup>65</sup> Standards that emphasize skills such as sharing, self-control, and building relationships with peers and adults have generally been left out of the standards for children in elementary, middle, and high school. Standards should be accompanied by professional development opportunities that highlight the inclusion of these skills as a core component of effective teaching practices.

The U.S. departments of Education and Health and Human Services, as part of the collection and dissemination of large-scale data sets, should identify metrics to track and ensure that these data are a consistent part of nationally representative data sets across all levels of early education from birth to third grade. This may include funding for pilot projects and other activities to support the collection of such data for appropriate sample sizes in order to facilitate uniform data collection. While the Classroom Assessment Scoring System, or CLASS, and similar quality assessments are available for educational settings of all ages—from infants and toddlers through the K-12 years—states and local communities may need technical assistance to implement the evaluations.<sup>66</sup>

At the local level, schools and local providers can work together to create teams across grade levels to share information about children’s development, including developmental screening and assessments—with parental permission—and curricula. This information can help create plans to scaffold learning across grade levels that is individualized to the needs of students coming into kindergarten, first grade, and second grade and help teachers in early learning settings understand the standards and expectations of the early elementary environment.

---

## Ensure that teacher preparation and professional development support higher-order skill building

**Challenge:** There appears to be a mismatch between the high expectations in state college- and career-ready standards and classroom practices.

While the data show that children have limited exposure to the practices needed to build higher-level skills, they do not highlight the reasons why. One solution is to ensure that teacher preparation programs and professional development and learning initiatives incorporate information about children’s development in all domains. Specifically, in the prekindergarten year, professional development should focus on preparing teachers to support child learning in the full range of developmental domains, including cognitive, physical, social, and emotional development. Foundational skills within each domain are essential to prepare children for school and long-term success.

Additionally, between kindergarten and third grade, effective professional development for teachers of the youngest students should avoid didactic learning experiences, focusing instead on teachers’ content knowledge and diversity of teaching methods.<sup>67</sup> Although teachers must be trained in a wide variety of strategies—including learning through play—in order to reach every student, few teacher preparation programs ensure that future teachers receive this kind of training.<sup>68</sup> Some teacher preparation programs, for example, only train elementary teachers in a single mathematics methods class, but several techniques may be required to ensure that young students understand a complex concept.<sup>69</sup> These programs should be expanded to include specific, effective practices that support children’s problem-solving skills and build higher-order skills in literacy and math while developing the social and emotional skills needed to be successful. These programs should be expanded to include specific effective practices that support children’s problem-solving skills and build higher-order skills in literacy and math, while developing the social and emotional skills needed to be successful.

Once teachers in programs serving children from birth through third grade have the preparation and ongoing support needed to develop children’s learning in all domains, state and federal agencies should work together and with national organizations to develop appropriate classroom and program observations that can be used to improve quality. The information collected in these observations

should be available at the classroom level, school or program level, and state level to identify and share best practices, promote continuous improvement, and target programs needing additional supports, including coaching and mentoring and other technical assistance.

States should routinely gather stakeholders to assess whether alignment of standards and professional development efforts are meeting the needs of students across the birth-to-third-grade continuum. The results of these meetings can be shared widely and used to better align academic standards and those that address social and emotional learning and development. As states improve their alignment, the U.S. Department of Education can gather and analyze the standards and share promising models across the country.

# Conclusion

The early childhood field has an abundance of research on what works to support young children and help them gain the skills they need to be successful, including social, emotional, literacy, cognition, and math skills, along with approaches to learning and supports for physical development. Standards for what young children should know and be able to do have been a part of the early elementary landscape for decades. Yet the data show that the high-quality early learning environments that young children need to thrive are not widely available across the country. Moreover, there has been a failure to translate the knowledge of what children should know and be able to do into teaching practices for the early elementary years.

While expanded content standards are being codified at the state and local levels that describe what children are expected to know as they move from kindergarten to third grade, there is still a significant amount of work that needs to be done to ensure continuity across early education and K-12 systems. Federal, state, and local policymakers and stakeholders must help change policies and practices to increase access to the highest-quality programs for children who are most at risk and provide new opportunities, resources, and supports for teachers and families that improve the experiences of children from birth through the third grade.

# Appendix A

**TABLE A**  
**Children’s access to kindergarten literacy and math teaching practices**

Percent of kindergarten students who receive such instruction weekly and three or more times per week by child’s race and ethnicity and family’s income

		Child’s race				Household income			
		White	Black	Hispanic	Asian	Less than \$20,000	\$20,001–\$50,000	\$50,001–\$100,000	More than \$100,001
Percentage of children who received training weekly									
Literacy	Retelling stories	86%	92%	90%	84%	90%	87%	86%	86%
	Identifying the main idea of a story	85%	87%	88%	87%	87%	85%	85%	85%
Math	Counting beyond 100	47%	48%	43%	48%	46%	46%	47%	48%
	Identifying geometric shapes	59%	69%	72%	59%	73%	66%	60%	53%
	Reading graphs	66%	61%	62%	61%	65%	64%	65%	62%
Percentage of children who received training three or more times per week									
Literacy	Retelling stories	50%	61%	57%	51%	57%	53%	51%	52%
	Identifying the main idea of a story	56%	64%	62%	58%	62%	59%	57%	57%
Math	Counting beyond 100	34%	38%	31%	35%	35%	34%	34%	33%
	Identifying geometric shapes	29%	44%	46%	28%	46%	37%	31%	25%
	Reading graphs	41%	37%	35%	38%	37%	39%	41%	37%

Source: Author’s calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010-11* (U.S. Department of Education, 2011).

# Appendix B

**TABLE B**  
**Children’s access to first-grade literacy and math teaching practices**

Percent of children who are taught these skills on more than 80 days by the spring of the school year by child’s race and ethnicity and family’s income

	Child’s race				Household income			
	White	Black	Hispanic	Asian	Less than \$20,000	\$20,001–\$50,000	\$50,001–\$100,000	More than \$100,001
Literacy skills								
Breaking spoken words into sounds	82%	84%	77%	80%	82%	80%	81%	81%
Segment words into phonemes	78%	81%	75%	74%	79%	76%	76%	77%
Manipulating phonemes to form new words	77%	77%	74%	70%	76%	75%	75%	75%
Retell stories	60%	56%	57%	59%	57%	57%	59%	61%
Generate questions about characters, settings, and plots	55%	60%	53%	53%	56%	54%	53%	55%
Math skills								
Identifying the numbers that represent the 10’s and 1’s places in two-digit numbers	43%	39%	39%	38%	42%	41%	41%	43%
Counting to 120 starting at any number less than 120	31%	35%	31%	31%	33%	32%	30%	29%
Answering questions about data in a picture graph or bar graph	16%	15%	12%	13%	15%	15%	15%	13%

Source: Author’s calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010–11* (U.S. Department of Education, 2011).

# Appendix C

**TABLE C1**  
**Children’s access to second-grade literacy teaching practices**

Percent of children who are taught these skills on more than 80 days by the spring of the school year by child’s race and ethnicity and family’s income

	Child’s race				Household income			
	White	Black	Hispanic	Asian	Less than \$20,000	\$20,001–\$50,000	\$50,001–\$100,000	More than \$100,001
Reading accurately and fluently to support comprehension	80%	79%	73%	65%	78%	80%	78%	77%
Using sentence-level context to gain meaning of a word or phrase	61%	58%	56%	51%	59%	61%	59%	59%
Distinguishing long and short vowels in one-syllable words	50%	52%	47%	37%	50%	49%	50%	47%
Using information gained from illustrations or text to demonstrate understanding of a story’s characters, setting, or plot	47%	47%	44%	44%	48%	46%	47%	48%
Describing overall structure of a story, how the beginning introduces the story or how the ending concludes the action	38%	40%	42%	39%	40%	41%	38%	38%
Describing how characters in a story respond to major events and challenges	35%	44%	38%	44%	38%	34%	39%	38%
Identifying and knowing the meaning of common prefixes or suffixes	23%	25%	29%	25%	25%	26%	24%	22%
Writing an opinion piece and giving reasons for the opinion	6%	10%	12%	16%	15%	9%	6%	6%

Source: Author’s calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010-11* (U.S. Department of Education, 2011).

TABLE C2

**Children's access to second-grade math teaching practices**

Percent of children who are taught these skills on more than 80 days by the spring of the school year by child's race and ethnicity and family's income

	Child's race				Household income			
	White	Black	Hispanic	Asian	Less than \$20,000	\$20,001–\$50,000	\$50,001–\$100,000	More than \$100,001
Adding and subtracting numbers that are equal to 20 or less	71%	65%	66%	50%	68%	68%	75%	60%
Skip-counting by 5's, 10's, and/or 100's	40%	39%	41%	30%	45%	41%	45%	34%
Solving word problems that involve quarters, dimes, nickles, and pennies	20%	23%	15%	22%	17%	20%	20%	19%
Working with equal-sized groups of objects to gain an understanding of multiplication	8%	13%	13%	12%	15%	10%	10%	7%
Measuring the length of an object in standard units by using tools such as rulers, yardsticks, meter sticks, and/or measuring tape	5%	7%	4%	7%	6%	5%	5%	3%
Drawing shapes when given specified attributes (eg the number of angles or the number of sides)	4%	6%	5%	7%	6%	6%	3%	4%
Identifying triangles, quadrilaterals, pentagons, hexagons, and cubes	3%	5%	5%	8%	6%	5%	4%	4%

Source: Author's calculations based on data from National Center for Education Statistics, *Early Childhood Longitudinal Study: Kindergarten Class of 2010-11* (U.S. Department of Education, 2011).

## Appendix D: Description of data

The analysis presented in this report is based on two data sets from the Early Childhood Longitudinal Study, or ECLS: its birth cohort, or ECLS-B, and the kindergarten class of 2010-11, or ECLS-K:2011.

The ECLS-B studied the experience of around 14,000 children from across the United States. Data were collected through parent interviews, self-administered questionnaires, resident and nonresident father self-questionnaires, child care provider and center director questionnaires, early care and education provider interviews and observation, and kindergarten teacher questionnaires. Additionally, in each year of data collection, participating children underwent assessments.<sup>70</sup> The longitudinal survey collected data on the cohort of children beginning when they were age 9 months in 2001-02, again at age 2 years in 2003-04, at age 4 years or preschool age in 2006-07, and when children were in kindergarten in 2007.

This report presents analysis of children who were of preschool age and in center-based care. The subsample used for analysis consists of around 4,600 children who are representative of more than 2 million children. A majority—56 percent—of children within this subset are white, while 21 percent are Hispanic, 15 percent are African American, 3 percent are Asian, and 3 percent are two or more races. Similarly, 20 percent are in households with annual incomes less than \$20,000, 32 percent between \$20,000 and \$50,000, 29 percent between \$50,000 and \$100,000, and 19 percent more than \$100,000. Children were also in a variety of center-based child care settings, with 18 percent in a public school, 21 percent in a private school, 11 percent in a child care center, 16 percent in a Head Start program, and 30 percent in a preschool or nursery school.<sup>71</sup>

Data collected in the ECLS-K were used to analyze children in kindergarten and first grade. The ECLS-K study follows approximately 18,000 students, representing more than 4 million children. Data for this study are also collected through a series of instruments and assessment, including parent interviews in the spring and fall of each year, fall and spring teacher questionnaires, and questionnaires

completed in the spring by special education teachers, new teachers, school administrators, and child care providers and directors.<sup>72</sup> Collection of data began in the fall of 2010 and will be completed for the cohort in the spring of 2016.<sup>73</sup>

The analysis in this report considers children from the full ECLS-K sample. Within the cohort, 52 percent of children are white, 25 percent are Hispanic, 13 percent are African American, 4 percent are Asian, and 4 percent are two or more races. Children also come from diverse economic backgrounds, with 15 percent in households with annual family income less than \$20,000, 23 percent between \$20,000 and \$50,000, 23 percent between \$50,000 and \$100,000, and 16 percent more than \$100,000.<sup>74</sup>

---

## About the authors

**Danielle Ewen** is a senior policy advisor at EducationCounsel LLC. She has served in numerous leadership positions in child care and early education policy. She previously served as the director of the Office of Early Childhood Education in the District of Columbia Public Schools, or DCPS, where she oversaw the operations of programs serving 3- and 4-year-olds in high-quality, comprehensive classrooms. Prior to her work in DCPS, Ewen served as the director of the child care and early education team at the Center for Law and Social Policy, or CLASP. At CLASP, she worked on federal and state issues around child care and early education, particularly the reauthorizations of the Child Care and Development Block Grant and Head Start.

Ewen also worked at the Children's Defense Fund as a senior program associate in the child care and development division and was the assistant director for the National Child Care Information Center. Early in her career, she worked as a policy analyst at the U.S. Department of Education Office of Migrant Education, where she was involved in issues related to implementation of Chapter 1 programs, family literacy, bilingual education, and evaluation. She holds a bachelor's degree from the University of California, Berkeley, and a master's in public administration from Columbia University.

**Rachel Herzfeldt-Kamprath** is a Policy Analyst for the Early Childhood Policy team at the Center for American Progress. Prior to joining CAP, Herzfeldt-Kamprath completed graduate-study internships with the White House Office of Management and Budget and the Center on Budget and Policy Priorities, focusing on analyzing economic and federal budget data and the impact of policy decisions on low-income communities. Before graduate school, Herzfeldt-Kamprath worked on state-level policy advocacy and community organizing in Minnesota, where her work ranged from issues related to child care and early education funding, abuse and neglect, and poverty to human trafficking and affordable housing. Herzfeldt-Kamprath also participated in the Lutheran Volunteer Corps for two years, serving in California and Minnesota. She holds a bachelor's degree from Pacific Lutheran University in Tacoma, Washington, and a master's of science in public policy and management from the Heinz College of Carnegie Mellon University in Pittsburgh, Pennsylvania.

---

## Endnotes

- 1 The Nation's Report Card, "Top Stories in NAEP Long-Term Trend Assessments 2012," available at [http://www.nationsreportcard.gov/ltr\\_2012/](http://www.nationsreportcard.gov/ltr_2012/) (last accessed November 2015).
- 2 The Nation's Report Card, "Which student groups are making gains?," available at [http://www.nationsreportcard.gov/reading\\_math\\_2013/#/gains-by-group](http://www.nationsreportcard.gov/reading_math_2013/#/gains-by-group) (last accessed November 2015). While Asian American students have the highest levels of educational achievement, this can mask disparities within the Asian American population between national groups. Specifically, Southeast Asian refugee populations tend to have the lowest levels of educational attainment among Asian Americans. For more information, see Karthick Ramakrishnan and Farah Z. Ahmad, "Education: Part of the 'State of Asian Americans and Pacific Islanders' Series" (Washington: Center for American Progress, 2014), available at <https://cdn.americanprogress.org/wp-content/uploads/2014/04/AAP-EdEducation.pdf>.
- 3 Tamara Halle and others, "Disparities in Early Learning and Development: Lessons from the Early Childhood Longitudinal Study – Birth Cohort (ECLS-B)" (Washington: Child Trends, 2009).
- 4 Julia Isaacs, "Starting School at a Disadvantage: The School Readiness of Poor Children" (Washington: The Brookings Institution, 2012), available at [http://www.brookings.edu/~media/research/files/papers/2012/3/19%20school%20disadvantage%20isaacs/0319\\_school\\_disadvantage\\_isaacs.pdf](http://www.brookings.edu/~media/research/files/papers/2012/3/19%20school%20disadvantage%20isaacs/0319_school_disadvantage_isaacs.pdf).
- 5 Ibid.
- 6 Christina Weiland and Hirokazu Yoshikawa, "Impacts of a Prekindergarten Program on Children's Mathematics, Language, Literacy, Executive Function, and Emotional Skills," *Child Development* 84 (6) (2013): 2,112–2,130, available at <http://www.crocus.georgetown.edu/factcenter> (last accessed November 2015); Ellen Peisner-Feinberg, Jennifer Schaaf, and Dore LaForett, "Children's Growth and Classroom Experiences in Georgia's Pre-K Program" (Chapel Hill, NC: Frank Porter Graham Child Development Institute, 2013), available at <http://decal.ga.gov/documents/attachments/GAPreKEval2011-2012Report.pdf>.
- 7 W. Steven Barnett and others, "Abbott Preschool Program Longitudinal Effects Study: Fifth Grade Follow-Up" (New Brunswick, NJ: Rutgers National Institute for Early Education Research, 2013), available at <http://nieer.org/sites/nieer/files/APPLES%205th%20Grade.pdf>; NICHD Early Child Care Research Network, "Early Child Care and Children's Development in the Primary Grades: Follow-Up Results From the NICHD Study of Early Child Care," *American Educational Research Journal* 42 (3) (2005).
- 8 Frances A. Campbell and others, "Adult Outcomes as a Function of an Early Childhood Educational Program: An Abecedarian Project Follow-Up," *Developmental Psychology* 48 (4) (2012): 1033–1043; James J. Heckman and others, "A New Cost-Benefit and Rate of Return Analysis for the Perry Preschool Program: A Summary" (Bonn, Germany: Forschungsinstitut zur Zukunft der Arbeit Institute for the Study of Labor, 2010); Arthur J. Reynolds and others, "Age 26 Cost-Benefit Analysis of the Child-Parent Center Early Education Program," *Child Development* 82 (1) (2011): 379–404.
- 9 For a discussion of this research, see Jade M. Jenkins and others, "Preventing Preschool Fadeout through Instructional Intervention in Kindergarten and First Grade," Working Paper (Irvine Network on Interventions in Development, 2015), available at [http://inid.gse.uci.edu/files/2011/03/Jenkinsetal\\_Fadeout\\_SREE.pdf](http://inid.gse.uci.edu/files/2011/03/Jenkinsetal_Fadeout_SREE.pdf).
- 10 This analysis considers early education settings rated below minimal (less than 3) to be low quality; those that are between minimal and good (3 to less than 5) to be mediocre quality; and those that are between good and excellent (more than 5) to be high quality.
- 11 National Center for Education Statistics, "Early Childhood Longitudinal Programs (ECLS)," available at <http://nces.ed.gov/ecls/> (last accessed November 2015).
- 12 Frank Porter Graham Child Development Institute, "Environment Rating Scales," available at <http://ers.fpg.unc.edu/> (last accessed December 2015).
- 13 Donna M. Bryant and others, "Family and Classroom Correlates of Head Start Children's Developmental Outcomes," *Early Childhood Research Quarterly* 9 (1994); Ellen S. Peisner-Feinberg and others, "The relation of preschool child-care quality to children's cognitive and social developmental trajectories through second grade," *Child Development* 72 (5) (2001): 1534–1553; Rachel A. Gordon and others, "An assessment of the validity of the ECERS-R with implications for measures of child care quality and relations to child development," *Developmental Psychology* 49 (1) (2013): 146–160.
- 14 Ellen S. Peisner-Feinberg and others, "The children of the cost, quality, and outcomes study go to school" (Chapel Hill, NC: University of North Carolina, 1999).
- 15 Deborah Lowe Vandell and others, "Do Effects of Early Child Care Extend to Age 15 Years? Results From the NICHD Study of Early Child Care and Youth Development," *Child Development* 81 3 (2010): 737–756.
- 16 For information on the quality of Head Start programs, see Janet Currie and Matthew Neidell, "Getting Inside the 'Black Box' of Head Start Quality: What Matters and What Doesn't?" Working Paper 10,091 (National Bureau of Economic Research, 2003), p. 15, available at <http://www.nber.org/papers/w10091>.
- 17 Head Start, "Head Start Program Facts Fiscal Year 2012," available at <http://eclkc.ohs.acf.hhs.gov/hslc/data/factsheets/2012-hs-program-factsheet.html> (last accessed November 2015).
- 18 Milagros Nores and Steven Barnett, "Access to High Quality Early Care and Education: Readiness and Opportunity Gaps in America" (New Brunswick, NJ: Center on Enhancing Early Learning Outcomes, 2014), available at [http://ceelo.org/wp-content/uploads/2014/05/ceelo\\_policy\\_report\\_access\\_quality\\_ece.pdf](http://ceelo.org/wp-content/uploads/2014/05/ceelo_policy_report_access_quality_ece.pdf).
- 19 Isaacs, "Starting School at a Disadvantage"; Margaret Burchinal and others, "Children's social and cognitive development and child care quality: Testing for differential associations related to poverty, gender, or ethnicity," *Applied Developmental Science* 4 (3) (2000): 149–165.
- 20 W. Steven Barnett and Donald J. Yarosz, "Who goes to preschool and why does it matter?" (New Brunswick, NJ: Rutgers National Institute for Early Education Research, 2007), available at <http://nieer.org/resources/policybriefs/15.pdf>.

- 21 Thomas Guskey, "Closing the achievement gap: Revisiting Benjamin S. Bloom's 'learning for mastery,'" *Journal of Advanced Academics* 19 (1) (2007), available at <http://files.eric.ed.gov/fulltext/EJ786608.pdf>. This is not to suggest that literacy and math skills are the only skills that matter for student success; social and emotional skills and other subject areas all contribute to student outcomes. The data gathered by the ECLS-K limit the analysis in this way.
- 22 Authors' calculations based on National Center for Education Statistics, "Birth Cohort (ECLS-B)," available at <http://nces.ed.gov/ecls/birth.asp> (last accessed November 2015).
- 23 Ibid.
- 24 Nores and Barnett, "Access to High Quality Early Care and Education."
- 25 Ibid.
- 26 Robert C. Pianta, "Improving Impacts of Classrooms: Professional Development and Classroom Observation," available at [http://www.nccp.org/projects/files/event\\_download\\_208.pdf](http://www.nccp.org/projects/files/event_download_208.pdf) (last accessed November 2015).
- 27 Sharon Lynn Kagan and others, "Reconsidering children's early development and learning: Toward common views and vocabulary" (Washington: National Education Goals Panel, 1995), available at <http://files.eric.ed.gov/fulltext/ED391576.pdf>.
- 28 National Council of Teachers of Mathematics, *Principles and Standards for School Mathematics* (2000).
- 29 Common Core State Standards Initiative, "Home," available at [www.corestandards.org](http://www.corestandards.org) (last accessed November 2015); Common Core State Standards Initiative, "English Language Arts Standards: Language: Kindergarten," available at [www.corestandards.org/ELA-Literacy/L/K](http://www.corestandards.org/ELA-Literacy/L/K) (last accessed November 2015); Common Core State Standards Initiative, "Kindergarten: Introduction," available at [www.corestandards.org/Math/Content/K/introduction](http://www.corestandards.org/Math/Content/K/introduction) (last accessed November 2015).
- 30 See, for example, Kirsty Clarke Brown, "The Common Core State Standards in early childhood education: summary," Preschool matters ... today! Blog, available at <http://preschoolmatters.org/2015/04/23/clarity-on-the-common-core-state-standards-in-early-childhood-education/>; Katrina Schwartz, "Does Common Core Ask Too Much of Kindergarten Readers," MindShift, April 27, 2015, available at <http://www2.kqed.org/mindshift/2015/04/27/does-common-core-ask-too-much-of-kindergarten-readers/>.
- 31 Nancy Carlsson-Paige, GERALYN Bywater McLaughlin, and Joan Wolfsheimer Almon, "Reading Instruction in Kindergarten: Much to Lose, Little to Gain" (New York: The Alliance for Childhood and Defending the Early Years, 2015), available at [http://www.allianceforchildhood.org/sites/allianceforchildhood.org/files/file/Reading\\_Instruction\\_in\\_Kindergarten.pdf](http://www.allianceforchildhood.org/sites/allianceforchildhood.org/files/file/Reading_Instruction_in_Kindergarten.pdf).
- 32 Jerry West, Kristin Denton, and Lizabeth M. Reaney, "The Kindergarten Year: Findings from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99" (Washington: National Center for Education Statistics, 2001).
- 33 Amy Rathbun, Jerry West, and Elvira Germino Hausken, "From Kindergarten through Third Grade: Children's Beginning School Experiences" (Washington: National Center for Education Statistics, 2004).
- 34 Kathleen A. Roskos, James F. Christie, and Donald J. Richgels, "The Essentials of Early Literacy Instruction" (Washington: National Association for the Education of Young Children, 2003).
- 35 Bonnie B. Armbruster, Fran Lehr, and Jean Osborn, "A Child Becomes a Reader: Kindergarten through Grade 3" (Washington: The Partnership for Reading and The National Institute for Literacy, 2006).
- 36 Common Core State Standards Initiative, "English Language Arts Standards: Reading: Literature: Kindergarten: 2," available at <http://www.corestandards.org/ELA-Literacy/RL/K/2/> (last accessed November 2015).
- 37 Common Core State Standards Initiative, "English Language Arts Standards – Reading: Informational Text, Kindergarten 2," available at <http://www.corestandards.org/ELA-Literacy/RI/K/2/> (last accessed November 2015).
- 38 Greg J. Duncan, "The Importance of Academic Skills for PreK-3rd" (New York: Foundation for Child Development, 2011), available at <http://fcd-us.org/sites/default/files/Brief%20on%20Academic%20Skills%20and%20School%20Readiness%2011311.pdf>.
- 39 Alan H. Schoenfeld and Deborah Stipek, "Math Matters: Children's Mathematical Journeys Start Early" (Los Altos, CA: Heising-Simons Foundation, 2011).
- 40 National Research Council, "Everybody counts: A report to the nation on the future of mathematics education" (1989).
- 41 Jerry West, Kristen Denton, and Elvira Germino-Hausken, "America's Kindergartners" (Washington: National Center for Education Statistics, 2000).
- 42 Ibid.
- 43 Ibid.
- 44 Mimi Engel and others, "The Misalignment of Kindergarten Mathematics Content" (Nashville: Vanderbilt University, 2015), available at [https://my.vanderbilt.edu/mimiengel/files/2012/09/Misalignment-Replication\\_AERA-2015.pdf](https://my.vanderbilt.edu/mimiengel/files/2012/09/Misalignment-Replication_AERA-2015.pdf).
- 45 Ibid.
- 46 Bernice Cullinan, "Independent Reading and School Achievement," *School Library Media Research* 3 (2000).
- 47 Kristin Denton and Jerry West, "Children's Reading and Mathematics Achievement in Kindergarten and First Grade" (Washington: National Center for Education Statistics, 2002).
- 48 Leila Fiester with Ralph Smith, "Early Warning! Why Reading at the End of Third Grade Matters" (Baltimore, MD: Annie E. Casey Foundation, 2010).
- 49 Ibid.
- 50 National Reading Panel, "Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction" (2000).
- 51 Common Core State Standards Initiative, "English Language Arts Standards: Reading: Foundational Skills: Grade 1," available at <http://www.corestandards.org/ELA-Literacy/RF/1/> (last accessed November 2015); Common Core State Standards Initiative, "English Language Arts Standards: Reading: Informational Text: Grade 1," available at <http://www.corestandards.org/ELA-Literacy/RI/1/> (last accessed November 2015).
- 52 Analysis of teaching frequency in first and second grade shifts to instruction on more than 80 days by the spring of the school year due to variations in data collection methods.

- 53 Nicole Gujardo and Kelly Cartwright, "The Contribution of Hot and Cool EF to Pre-Readers' Narrative Comprehension and Later Reading Comprehension in Elementary School" (Newport News, VA: Christopher Newport University, 2014).
- 54 Common Core State Standards Initiative, "Grade 1: Operations & Algebraic Thinking," available at <http://www.corestandards.org/Math/Content/1/OA/> (last accessed November 2015); Common Core State Standards Initiative, "Grade 1: Number & Operations in Base Ten," available at <http://www.corestandards.org/Math/Content/1/NBT/> (last accessed November 2015); Common Core State Standards Initiative, "Grade 1: Measurement & Data," available at <http://www.corestandards.org/Math/Content/1/MD/> (last accessed December 2015).
- 55 Max Marchitello and Catherine Brown, "Math Matters: How the Common Core Will Help the United States Bring Up Its Grade on Mathematics Education" (Washington: Center for American Progress, 2015).
- 56 Common Core State Standards Initiative, "English Language Arts Standards: Reading Literature: Grade 2 and Reading: Foundational Skills, Grade 2," available at <http://www.corestandards.org/ELA-Literacy/RL/2/> (last accessed November 2015); Common Core State Standards Initiative, "English Language Arts Standards: Foundational Skills, Grade 2," available at <http://www.corestandards.org/ELA-Literacy/RF/2/> (last accessed December 2015); Common Core State Standards Initiative, "English Language Arts Standards: Writing, Grade 2," available at <http://www.corestandards.org/ELA-Literacy/W/2/> (last accessed December 2015).
- 57 Lisa S. Goldstein, *Using Developmentally Appropriate Practice to Teach the Common Core: PK-3* (London: Routledge, 2015).
- 58 Common Core State Standards Initiative, "Grade 2: Operations & Algebraic Thinking," available at <http://www.corestandards.org/Math/Content/2/OA/> (last accessed December 2015); Common Core State Standards Initiative, "Grade 2: Number & Operations in Base 10," available at <http://www.corestandards.org/Math/Content/2/NBT/> (last accessed December 2015); Common Core State Standards Initiative, "Grade 2: Measurement & Data," available at <http://www.corestandards.org/Math/Content/2/MD/> (last accessed December 2015); Common Core State Standards Initiative, "Grade 2: Geometry," available at <http://www.corestandards.org/Math/Content/2/G/> (last access December 2015).
- 59 Donna Cooper and Kristina Costa, "Increasing the Effectiveness and Efficiency of Existing Public Investments in Early Childhood Education" (Washington: Center for American Progress, 2012).
- 60 Melissa Tooley and Laura Bornfreund, "Skills for Success: Supporting and Assessing Key Habits, Mindsets, and Skills in PreK-12" (Washington: New America, 2015), available at [http://www.newamerica.org/downloads/11212014\\_Skills\\_for\\_Success\\_Tooley\\_Bornfreund.pdf](http://www.newamerica.org/downloads/11212014_Skills_for_Success_Tooley_Bornfreund.pdf).
- 61 ChildTrends, "Child Care: Indicators on Children and Youth" (2013), available at [http://www.childtrends.org/wp-content/uploads/2012/07/21\\_Child\\_Care.pdf](http://www.childtrends.org/wp-content/uploads/2012/07/21_Child_Care.pdf).
- 62 Martha Zaslow and others, "Quality Dosage, Thresholds, and Features in Early Childhood Settings: A Review of the Literature" (Washington: Administration for Children and Families, 2010).
- 63 See, for example, Malia Villegas, "Full-Day Kindergarten: Expanding Learning Opportunities" (San Francisco: WestEd, 2005); Kerry Englert and Seneca Consulting, "Research Review Supporting the Nebraska Poverty Plan Components" (Nebraska Department of Education, 2010), available at <http://www.education.ne.gov/povertyandlep/PDF/REL%20Central%20NE%20Poverty%20Plan%20Report%20October%207%202010.pdf>.
- 64 See, for example, Danielle Ewen and LeighAnn M. Smith, "Fostering School Success with Standards for Nonacademic Skills" (Washington: Center for American Progress, 2015).
- 65 Robert Wood Johnson Foundation, "How Children's Social Skills Impact Success in Adulthood: Research Brief" (2015), available at [http://www.rwjf.org/content/dam/farm/reports/issue\\_briefs/2015/rwjf421663](http://www.rwjf.org/content/dam/farm/reports/issue_briefs/2015/rwjf421663).
- 66 Teachstone, "Age Levels," available at <http://teachstone.com/the-class-system/age-levels/> (last accessed November 2015).
- 67 Erica N. Walker, "Rethinking Professional Development for Elementary Mathematics Teachers," *Teacher Education Quarterly* (Summer 2007), available at <http://files.eric.ed.gov/fulltext/EJ795178.pdf>.
- 68 Sarah Carr, "Pre-K Has Changed. Can Teachers Keep Up?," *Slate*, November 6, 2014, available at [http://www.slate.com/blogs/schooled/2014/11/06/teaching\\_pre\\_k\\_higher\\_standards\\_not\\_enough\\_training\\_and\\_the\\_importance\\_of.html](http://www.slate.com/blogs/schooled/2014/11/06/teaching_pre_k_higher_standards_not_enough_training_and_the_importance_of.html).
- 69 Walker, "Rethinking Professional Development for Elementary Mathematics Teachers."
- 70 National Center for Education Statistics, "Birth Cohort (ECLS-B)."
- 71 Authors' analysis of National Center for Education Statistics, "Birth Cohort (ECLS-B)."
- 72 National Center for Education Statistics, "Data Collection Instruments," available at <http://nces.ed.gov/ecls/instruments2011.asp> (last accessed November 2015).
- 73 Ibid.
- 74 Authors' analysis of National Center for Education Statistics, "Kindergarten Class of 2010-11 (ECLS-K:2011)," available at <https://nces.ed.gov/ecls/kindergarten2011.asp> (last accessed November 2015).

---

## Our Mission

The Center for American Progress is an independent, nonpartisan policy institute that is dedicated to improving the lives of all Americans, through bold, progressive ideas, as well as strong leadership and concerted action. Our aim is not just to change the conversation, but to change the country.

## Our Values

As progressives, we believe America should be a land of boundless opportunity, where people can climb the ladder of economic mobility. We believe we owe it to future generations to protect the planet and promote peace and shared global prosperity.

And we believe an effective government can earn the trust of the American people, champion the common good over narrow self-interest, and harness the strength of our diversity.

## Our Approach

We develop new policy ideas, challenge the media to cover the issues that truly matter, and shape the national debate. With policy teams in major issue areas, American Progress can think creatively at the cross-section of traditional boundaries to develop ideas for policymakers that lead to real change. By employing an extensive communications and outreach effort that we adapt to a rapidly changing media landscape, we move our ideas aggressively in the national policy debate.

---

Center for American Progress

