



Pre-K Curriculum Quality

Findings from the National Academy of Sciences consensus study, A New Vision for High-Quality
Preschool Curriculum (2024)

Presentation for CCSSO

May 22, 2025

In our session today, we'll share key findings from the preschool curriculum consensus study and consider how they might be useful to your work ahead



Context of our work



Elements of
High-Quality Pre-K
Curriculum: Consensus
Study Findings



Approaches to
Promoting Pre-K
Curriculum Quality



Questions & Discussion

Context of Our Work



How can the early learning field be supported to select and use high-quality pre-k curriculum?

Key research activities to date



Analyzed the **landscape of state policies** related to pre-k curriculum selection, implementation, and support



Conducted **interviews with early education leaders** in 34 states and leaders of 20+ early childhood organizations



Researched **demand drivers** for pre-k curriculum selection through interviews with pre-k program directors across five states



Gathered **teacher perspectives** on curriculum use and needs via focus groups with 65 teachers across three states

Research confirmed unmet curriculum needs, insufficient curriculum options, and limited curriculum quality criteria



MANY EARLY
LEARNING
LEADERS
SAID...

- The **early childhood field does not have a common, research-informed definition of high-quality pre-k curriculum** that is responsive to the needs and strengths of diverse learners, children with special needs, and children from low income backgrounds
- Pre-k leaders, directors, and teachers **need better tools** to support curriculum selection and implementation
- Curricular options are insufficient** to meet the needs of diverse learners in diverse pre-k settings and most commonly used curricula **lack efficacy evidence**
- Criteria** to evaluate the quality of pre-k curricula **are limited**

Stakeholder interviews showed that the early learning field aligned on many features of curricular quality, but there were many areas of debate

Areas of Broad Consensus

High-quality pre-k curricula should:

- Be developmentally appropriate
- Include clear scope and sequence while supporting individualization
- Address whole child
- Use constructivist play-based pedagogies
- Prioritize social-emotional development
- Link to formative assessments
- Be relevant to family backgrounds
- Engage families

Areas of Debate

Whether and/or how to:

- Use teacher-directed pedagogies
- Define “play”
- Promote child agency
- Define “academic” content
- Use domain-specific curricula
- Use scripted curricula
- Use practices that are responsive to family backgrounds
- Engage families

The National Academy of Sciences conducted a consensus study to address field needs and provide a research-based guidance on high-quality preschool curriculum

A 13-member committee developed the consensus study on high-quality preschool curriculum. The committee included experts in early childhood education, in areas such as early childhood development, equity, curriculum development, implementation science, public policy, children with disabilities, child health, mental health, and neuroscience. The committee also held a series of public information sessions to gather input from researchers, policymakers, and practitioners. Committee members included:

- **Susan Bredekamp, Ph.D., (Co-Chair)** an Early Childhood Education Specialist on curriculum, teaching, and professional development. She consults for national and state organizations, institutions of higher education, departments of education, and Head Start.
- **Linda M. Espinosa, Ph.D., (Co-Chair)** was a Professor of Early Childhood Education at the University of Missouri, Columbia, and has served as the Co-Director of the National Institute for Early Education Research (NIEER) at Rutgers University and Vice President at Bright Horizons Family Solutions.
- **Deana M. Around Him, Dr.P.H.,** is a Senior Research Scientist at Child Trends and adjunct faculty member at the Johns Hopkins School of Nursing. She also serves on the Tribal Early Childhood Research Center's Leadership Team.
- **Garnett Saunders Booker III, M.S.,** is an Early Childhood ELL Teacher with District of Columbia Public Schools.
- **Douglas H. Clements, Ph.D.,** is a Kenney Endowed Chair in Early Childhood Learning, Professor, and Executive Director of the Marsico Institute of Early Learning and Literacy at University of Denver's Morgridge College of Education.
- **Lillian Durán, Ph.D.,** is currently a Professor in the Department of Special Education and Clinical Sciences at the University of Oregon.
- **Iheoma U. Iruka, Ph.D.,** is a Research Professor in Public Policy and the Founding Director of the Equity Research Action Coalition at the Frank Porter Graham Child Development Institute at UNC-Chapel Hill.
- **Susan C. Levine, Ph.D.,** is the Rebecca Anne Boylan Distinguished Service Professor of Education and Society in the Department of Psychology at the University of Chicago, joining the faculty after receiving her Ph.D. in Psychology at M.I.T.
- **Joan L. Luby, M.D.,** is the Samuel and Mae S. Ludwig Professor of Psychiatry (Child) at the Washington University School of Medicine where she founded and leads the Early Emotional Development Program.
- **Camille Maben,** is the Executive Director of First 5 California.
- **Deborah A. Phillips, Ph.D.,** is Professor of Psychology, and Associated Faculty of Public Policy at Georgetown University.
- **Christina J. Weiland, Ed.D.,** is an Associate Professor at the University of Michigan's School of Education and (by courtesy) Ford School of Public Policy, where she also co-directs the Education Policy Initiative.
- **Vivian C. Wong, Ph.D.,** is a research methodologist in the field of Education. Currently, Dr. Wong is an Associate Professor in Research, Statistics, and Evaluation in the School of Education and Human Development at the University of Virginia.

30+ state and district ECE leaders said that distilling the consensus study into an actionable guidance document would help them to use the study

State leaders said they wanted to use the consensus study for multiple purposes...	...but, that additional resources were needed to improve the study’s usability. They said:	The pre-k curriculum guide is designed to be...
● Inform curriculum review processes ● Inform curriculum implementation support ● Provide guidance for district and program leaders selecting curriculum ● Provide guidance for teacher self-reflection on curriculum ● Provide guidance for parents on high-quality preschool curriculum	The consensus study seems to have a lot of useful information on curriculum quality and implementation, but it is very long.	A shorter and highly-organized resource that provides key content to inform pre-k curriculum quality policies.
	Pre-k curriculum priorities may differ from state to state due to varied demographics, policy opportunities, and program resources.	Easily searchable to quickly access information about individual elements of pre-k curriculum quality and implementation.
	States want to incorporate consensus study guidance into state-developed processes and documentation in ways that reflect their particular contexts.	A Google Doc from which: (1) Content can be copied and pasted into state-specific resources (with citation). (2) Content in the consensus study can be quickly accessed via links to relevant parts of the study itself.

The guide we developed distills the study's guidance on elements of preschool curriculum quality, aiming to be an useful resource for ECE leaders



A Guide to Selecting High-Quality Preschool Curriculum

Based on the National Academy of Science's report, A New Vision for High-Quality Preschool Curriculum (2024)

In April 2024, the National Academies of Science, Engineering, and Medicine (NASEM) released a landmark study, [A New Vision for High-Quality Preschool Curriculum](#). The study represents the consensus vision of a diverse committee of experts in early childhood care and education (ECE). NASEM convened the committee to conduct a comprehensive study of preschool curriculum quality for children from ages three to five, with special attention to the needs of Black and Latine children, multilingual learners, children with disabilities, and children experiencing poverty in the United States. Drawing upon an extensive literature review, the report synthesizes valuable insights from the latest empirical and theoretical research on what constitutes a high-quality preschool curriculum and offers actionable guidance on how to select and implement high-quality preschool curricula. This document distills the findings and recommendations from the study to **provide guidance on identifying elements of quality in a preschool curriculum**. While the document is intended to be user-friendly and concise, readers are encouraged to use the links provided throughout to learn more from the wealth of information provided in the study itself.

The document is organized into the following sections:

- [What is a curriculum and why is using a curriculum important in preschool?](#)
- [What is the new vision for high-quality preschool curriculum?](#)
- [What foundational understandings underlie the vision of high-quality preschool curriculum?](#)
- [What key elements constitute a high-quality preschool curriculum?](#)
- [Why is attention to pre-k curriculum quality important now?](#)
- [How can states, districts, programs, and educators select high-quality preschool curriculum?](#)
- [How can leaders use the consensus study to support the selection of high-quality preschool curriculum?](#)
- [What support is available to support the early learning field to use the consensus study?](#)

The guide lists each element of pre-k curriculum quality, related descriptive content from the study, and questions to evaluate curriculum

Element of pre-k curriculum quality	Elements of Curriculum Quality and Report Sources	Description of Elements of Curriculum Quality	Questions to Ask When Considering Elements of Curriculum Quality	Questions that can be used to consider the extent to which curriculum content reflects the element of quality
Links to pages in the study where this element of quality is discussed	Supports multilingual learners and various language systems <i>Report sources:</i> xviii , 6 , 8 , 120 , 275 , 282 , 290 , 292 , 293 , 296 , 298 , 300 , 301 , 303 , 304 , 305 , 310 , 311 , 312	High-quality curricula address the specific strengths and needs of multilingual learners and promote emergent bilingualism as an equitable goal for children who speak a language other than English or in addition to English in the home. - Curricula should implement the most effective language model for multilingual learners – teaching them English systematically while actively supporting their home language development. - Curricula and supporting materials should be provided in Spanish, English, and other languages commonly spoken by children with a home language other than English. - A critical first step in providing equitable, high-quality early care and education for multilingual learners is to recognize and build upon their linguistic, cultural, and social assets and talents. - Curricula should include adaptations of instructional practices that scaffold language development and comprehension, as well as materials and learning experiences that accurately reflect and build on the cultures and languages of multilingual children and their families. - Multilingual learners benefit from frequent, responsive, and enriched language interactions. Early, balanced exposure to dual languages, with at least 40% of the time dedicated to each language, is linked to high proficiency in both languages and improved long-term academic achievement for multilingual learners. - Curricula centered around child-led activities, which support	- Is emergent bilingualism for multilingual learners a goal? - To what extent are curriculum and supporting materials provided in Spanish, English, and other languages commonly spoken by children with a home language other than English? - To what extent does the curriculum guide adaptations of instructional practices that scaffold language development and comprehension, in both English and multilingual children's home language, as well as materials and learning experiences that accurately reflect and build on the cultures and languages of multilingual children and their families? For example, does the curriculum provide multiple methods of communicating meanings of words – such as hand or body gestures, pictorial representations, concrete objects from everyday life – and connect instructional content to children's cultural backgrounds and family	We welcome any feedback you can share about how this guide can be most helpful to you!

Elements of High-Quality Preschool Curriculum

The consensus study provides a new vision for high-quality preschool curriculum and offers detailed guidance and recommendations for decision makers



1. Incorporate the perspectives, experiences, cultures, languages, strengths, and needs of a range of children, families, and workforce settings;
2. Include rich and meaningful content that centers child engagement and agency;
3. Include well-designed learning experiences, intentional responsive teaching strategies, well-defined objectives and outcomes, embedded formative assessments, and differentiation based on understanding children's ability levels, diverse backgrounds, interests, and dispositions;
4. Have a scope and sequence that follow children's ways of thinking and learning with research-validated learning trajectories, affirm children's diverse backgrounds, and include effective supports for children with disabilities; and
5. Demonstrate effectiveness in yielding positive school and life outcomes for the children and families they are intended to reach.

As a foundational concept underlying their vision, the report discusses the importance of rejecting false dichotomies

The report calls for “resolving the tensions and complexities inherent in educational decisions [by] rejecting these false dichotomies and moving to both/and thinking (Bredekamp & Willer, 2022)” (p. 4-4).

Play——Academics
Emergent——Highly scripted
Child-initiated——Teacher-directed
Exploratory——Content-focused
Comprehensive/whole child——Domain-specific
Active Learning——Passive acquisition
Investigatory——Didactic
Social-emotional——Cognitive
Spontaneous——Deliberate
Out-of-School Language and Reasoning——School-based Language and Reasoning

Elements of high-quality curriculum described in the report can be summarized as follows:

- [Research-based](#)
- [Evidence-based for child outcomes](#)
- [Includes scope and sequence](#)
- [Focuses across developmental domains and content areas or coherently incorporates domain-specific curriculum](#)
- [Covers content and learning domains in depth](#)
- [Clearly defines specific developmentally appropriate learning goals](#)
- [Includes well-designed learning experiences and interactions](#)
- [Emphasizes responsive, intentional teaching](#)
- [Provides guidance to prepare developmentally appropriate, engaging learning environments, materials, and schedules](#)
- [Supports teaching and learning that are relevant and responsive to children's family backgrounds](#)
- [Supports multilingual learners and various language systems](#)
- [Provides individuation and effective supports for children with identified disabilities](#)
- [Supports individualized instruction for every child](#)
- [Supports family engagement](#)
- [Includes ongoing assessment tools and strategies aligned with goals and experiences](#)
- [Provides professional development](#)
- [Includes multiple modes of learning](#)
- [Supports positive interactions](#)
- [Uses a strength-based/asset-based approach](#)
- [Emphasizes playful learning and guided play](#)
- [Prioritizes child engagement and agency](#)
- [Balances constrained and non-constrained skills](#)
- [Anti-bias, anti-racist, and equitable approach](#)
- [Includes teacher educative content](#)
- [Usable, accessible, and supports implementation with fidelity](#)
- [Uses technology appropriately](#)
- [Leverages appropriate curriculum developers' expertise](#)
- [Horizontally and vertically aligned](#)
- [Provides appropriate approaches for Indigenous communities](#)

Supplementary domain- and content-focused guidance is also provided in the report for:

- [Social and emotional learning](#)
- [Executive functioning](#)
- [Language and literacy](#)
- [Math](#)
- [Science and engineering learning](#)

More details are available for each of the quality elements. For our conversation today, we'll dive more deeply into six of the quality elements:

- [Includes scope and sequence](#)
- [Covers content and learning domains in depth](#)
- [Playful learning and guided play](#)
- [Supports teaching and learning that are relevant and responsive to children's family backgrounds](#)
- [Supports multilingual learners and various language systems](#)
- [Provides individuation and effective supports for children with identified disabilities](#)

Includes scope and sequence

What does the consensus study say about it?

The curriculum include activities to be carried out in a particular order, matching children’s developmental trajectories for each of the domains covered by the curriculum.

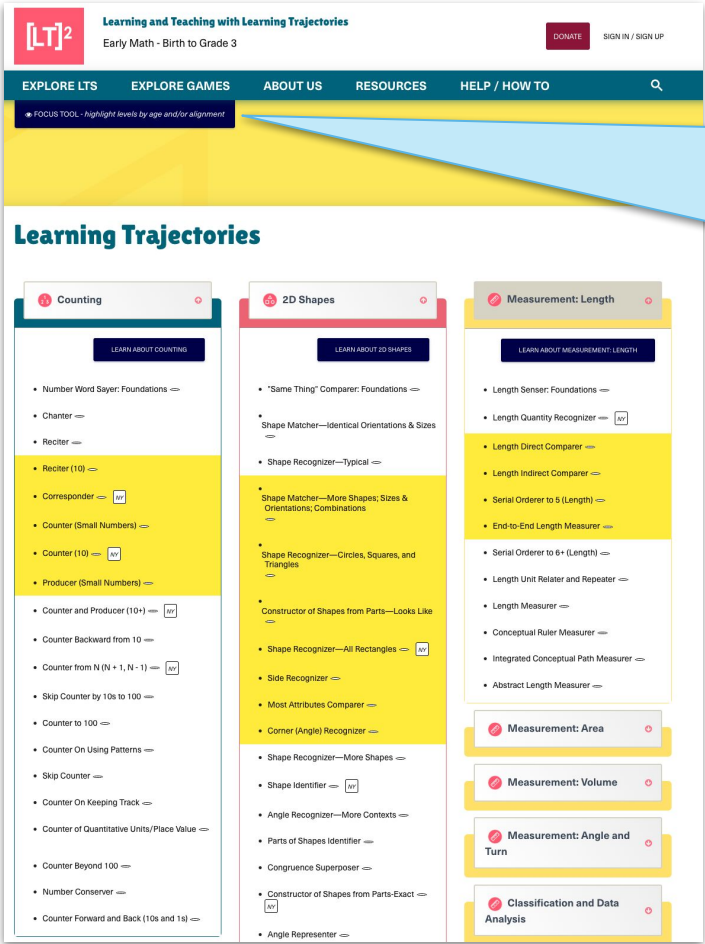
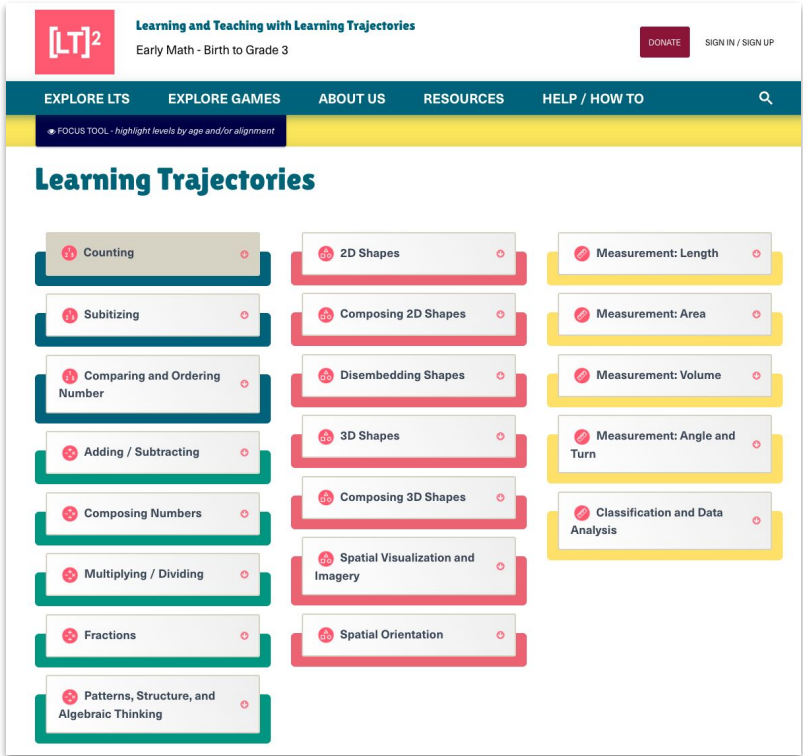
- Content areas and developmental domains—including social, emotional, and physical—need to be addressed systematically and sequentially (Burchinal et al., 2022; Clements, 2007).
- Domain-specific curricula following a specific scope and sequence have generally been more successful in improving targeted child outcomes relative to comprehensive or teacher-created curricula (Clements et al., 2023; Jenkins et al., 2018; Mattera et al., 2018; Phillips et al., 2017b; Wakabayashi et al., 2020; Yoshikawa et al., 2013).

What are questions that can help evaluate curriculum?

- To what extent does the curriculum provide an **organized framework and sequence to guide teachers’ decision-making regarding the content and progression of children’s development and learning?**
- To what extent does the curriculum have a **scope and sequence for each domain covered** that follows children’s ways of thinking and learning with research-validated learning trajectories?
- If teachers are intended to choose the order of curriculum activities, to what extent are **teachers offered guidance on how to implement activities based on research-validated learning trajectories?**

Scope and Sequence: Math

Math Learning Trajectories, developed by Drs. Clements and Sarama, leverage research on children’s developmental progressions to outline how children develop their mathematical skills, and how these skills can be taught in sequence in playful ways that build upon prior learning.



Using the Focus Tool, educators can highlight skills by age/grade and those aligned to NY state standards.

Covers content and learning domains in depth

What does the consensus study say about it?	Curriculum should include rich and meaningful content that centers child engagement and agency. High-quality curricula provide guidance for content-specific teaching, rich and varied learning experiences, and supports for all aspects of children’s development. • In many instances, teaching academics is pitted against developmentally appropriate practice, a view that underestimates children’s competence and denies them challenging curriculum (Bredekamp & Joseph, 2024, p. 140; see also Sullivan et al., 2015). • The key is to make academic content meaningful and engaging for young children, which is often not the case, particularly for children living in low-income communities and other subgroups of children (Adair & Colegrove, 2021; Boutte, 2024; Early et al., 2010; Malik et al., 2018; NASEM, 2023; Souto-Manning, 2018; Wright & Counsell, 2018). • Frequently used general approaches to curriculum implementation—including the project approach (Helm & Katz, 2016; Katz et al., 2014), the Reggio Emilia approach, the Cycle of Inquiry (Broderick & Hong, 2020; Edwards et al., 1993, 2012; Rinaldi, 2021), and learning trajectories approaches—represent ways of conceptually organizing and deeply engaging children with curriculum content.
What are questions that can help evaluate curriculum?	• To what extent does the curriculum include progressive steps and individual learning experiences that support teachers’ coverage of content in depth? • For each domain covered by the curriculum, to what extent is there a progression of activities and experiences that appears to increase the level of challenge and complexity of skills and knowledge? • To what extent are children given opportunities in the curriculum to use skills they have mastered in more complex ways? To what extent are children given opportunities to expand their knowledge in new and more complex ways? • To what extent does the curriculum include guidance for content-specific teaching, rich and varied learning experiences, and supports for all aspects of children’s development? • To what extent does the curriculum include “academic” content that is meaningful and engaging for young children? • To what extent is the curriculum organized conceptually to make content knowledge more meaningful, engaging, and understandable for young children?

Emphasizes playful learning and guided play

What does the consensus study say about it?	High-quality curricula promote joyful, engaged learning for all children (Bohart & Procopio, 2022). Children learn from play, exploration, and pedagogy that are responsive to their interests. • Instruction that includes more play-based activities designed to foster exploration, curiosity, complex language skills, and higher-order thinking (e.g., acting out child-created narratives; exploring the conditions that lead plants to grow at different rates) are associated with positive long-term effects on children’s learning, as well as on their learning dispositions (e.g., Frausel et al., 2020, 2021). • Focusing on basic skills through direct instruction <i>to the exclusion</i> of agentic play-based activities may have unintended negative consequences because such gains have been found to fade over time (Bailey et al., 2016, 2017, 2020). • Play ranges from adult-directed play activities, in which the adult has a learning goal in mind; to guided play, in which the adult gives the child agency but provides scaffolding and guidance with a learning goal in mind; to free play, in which the child both initiates and constructs play without a specific learning goal (Zosh et al., 2018). • Play may be powerful developmentally if the environment, interactions, and specific activities are introduced or guided by teachers. Such playful learning can include whole- and small-group activities, specific learning centers, and outdoor play. Research findings indicate that guided play supports not only the growth of content knowledge (the “what” of learning) but also the learning process (the “how” of learning), which together enable them to pursue their questions, problem solve, and collaborate.
What are questions that can help evaluate curriculum?	• To what extent does the curriculum promote joyful, engaged learning and support teachers to implement play, exploration, and pedagogy that are responsive to children’s interests? • To what extent does the curriculum include a range of intentional play experiences, including adult-directed playful activities (in which the adult has a learning goal in mind), guided play (in which the adult gives the child agency but provides scaffolding and guidance with a learning goal in mind), and free play (in which the child both initiates and constructs play without a specific learning goal), with an overall emphasis on guided play, which enables children to pursue their questions, problem solve, and collaborate? • To what extent does the curriculum include play-based activities designed to foster exploration, curiosity, complex language skills, and higher-order thinking?

Supports teaching and learning that is relevant and responsive to children's family backgrounds

What does the consensus study say about it?

- High-quality curricula:
 - incorporate the perspectives, experiences, traditions, languages, strengths, and needs of a diverse range of children and families,
 - provide guidance for teachers on how to adapt lessons and materials to children's diverse backgrounds and languages (this scaffolding is particularly important if educators have had minimal teacher preparation; lack deep content knowledge; have little classroom support; or teach in classrooms in which the children have a wide range of abilities, backgrounds, and languages.); and
 - include specific strategies to help teachers interact with children and their families, create relevant and responsive learning experiences, and use relevant instructional resources.
- Relevance and responsiveness is made visible in the classroom through classroom materials (e.g., images and resources representative of the children in the classroom and the wider world), processes (i.e., providing children with background information so they can interact meaningfully with instructional content), and products (i.e., making children's learning visible to highlight different perspectives and experiences).
- Relevant and responsive classrooms adopt an asset-based approach that draws on children's backgrounds, languages, abilities, and experiences to make learning meaningful and relevant; help build positive and healthy identities; support inclusive classroom practices; and help children achieve success in school (Ladson-Billings, 1995b).

What are questions that can help evaluate curriculum?

- To what extent does the curriculum promote an **asset-based approach** that **incorporates the perspectives, experiences, traditions, languages, strengths, and needs of a diverse range of children and families**?
- To what extent does the curriculum **build on prior knowledge and competence acquired in children's families and communities**?
- To what extent does the curriculum **provide guidance for teachers on how to adapt lessons and materials to children's backgrounds and languages** and include **specific strategies to help teachers interact with children and their families, create relevant and responsive learning experiences and instructional resources**?
- To what extent does the curriculum **strengthen students' feeling of belonging and connectedness to school**?
- To what extent is this **relevance and responsiveness made visible in the classroom** through classroom materials, processes, and products?

Supports multilingual learners and various language systems

What does the consensus study say about it?

High-quality curricula address the specific strengths and needs of multilingual learners and promote proficiency in English and their home language.

- The curriculum implements the most effective language model for multilingual learners – teaching them English systematically while actively supporting their home language development. Curriculum and supporting materials are provided in Spanish, English, and other languages commonly spoken by children, including appropriate ongoing assessment instruments and methods for monitoring growth in both languages (National Academies, 2017).
- Curricula include adaptations of instructional practices that scaffold language development and comprehension. There should be a concentrated effort on cultivating early literacy skills, prioritizing the enhancement of oral language and vocabulary development. Early, balanced exposure to dual languages, with at least 40% of the time dedicated to each language, is linked to high proficiency in both languages and improved long-term academic achievement for multilingual learners.
- In classrooms serving multilingual learners, where the primary goal is English with some support for home language, high-quality curricula:
 - Supply books and environmental text, such as labels, in the native languages of students, along with educational and play resources.
 - Prepare educators with basic words and phrases to use with multilingual learners (Espinosa & Crandell, 2020).
 - Use multiple methods of communicating meanings of words and connecting instructional content to children’s family backgrounds and traditions (Brodziak de los Reyes et al., 2022; National Academies, 2017).
 - Provide opportunities for multilingual learners to interact with their English-speaking peers during open-ended activities and Spanish-speaking peers during teacher-led small-group activities (Espinosa & Crandell, 2020).
 - Encourage multilingual preschoolers to use all of their linguistic knowledge when communicating.

What are questions that can help evaluate curriculum?

- To what extent are **curriculum and supporting materials provided in Spanish, English, and other languages** commonly spoken by children?
- To what extent does the curriculum **guide adaptations of instructional practices that scaffold language development and comprehension**? For example, does the curriculum provide **multiple methods of communicating meanings of words** – such as hand or body gestures, pictorial representations, and concrete objects from everyday life?
- To what extent does the curriculum include **tools and methods for monitoring growth in both home languages and English**?
- To what extent does the curriculum **support partnering with families** to collaboratively develop language goals and **collecting important contextual information about multilingual learners** (e.g., age of acquisition of each language, extent and nature of exposure to each language, and key family characteristics and histories)?
- To what extent does the curriculum have **frequent, responsive, and enriched language interactions** (e.g. posing interesting questions, engaging in turn taking in extended conversations, exposure to vocabulary that is rich in content and contains diverse sentence structures)?

Example of supporting multilingual learners: Great First Eight

The **Great First Eight** curriculum centers multilingual learners; a professional learning session is dedicated to Language Diversity. Teacher guidance for supporting multilingual learners is embedded throughout curriculum content.



STEPS

Alphabet, Names, Letters, & Sounds (Whole Group: 30 minutes)

1. **Introduce or review the alphabet (5 minutes).** Begin by introducing the concept of the alphabet. "The **alphabet** is letters we use to spell sounds so we can read and write. There are 26 **letters** in the alphabet."
 - a. Invite any multilingual children in your class to describe letters or symbols that they may know in their writing system that may differ from English.
 - b. Play the Great First Eight Alphabet Song 2 times. Let children sing and dance along.

DAY: 1
PART OF DAY: MATH MARVELS
UNIT: MUSIC MOVES US

side. Elicit that they can use the equal symbol and write $3 = 3$. Then, tell children you see two guitars close together on the left and one **more** guitar. Write $2 + 1$ on the board. Ask children what you get when you add $2 + 1$. Elicit 3, and complete the **equation**: $2 + 1 = 3$. Tell children that this is an **equation**. Ask the class to repeat the word equation. Explain that equations represent that two things are **equal** or the same amount.

Second problem of Marvel Math Talk

3. **Posing the problem.** Show slide 3 from the Lesson Slides. Ask children to observe quietly for a minute and think about an equation that can represent the number of drums they see. Use gestures to help children see the two groups they are comparing: the drums on the left and the drums on the right. Ask children to signal when they have an idea to share (for example, by holding a thumb up by their chest).

4. **Discussing the problem.** Once children signal they have an idea, ask for a volunteer to share their equation. Remind children you will use numbers and math symbols to represent this image as an equation.

Note: If necessary, scaffold the construction of the equation. For example, ask the child how many drums there are on the left, and elicit and write 4. Next, ask if there are the same number of drums on both sides, and elicit and write $=$. Then, ask how many drums there are in each row on the right, and elicit and write $2 + 2$.

5. **Reading the equation.** Read the complete equation (four equals two plus two). Ask children to join in reading the equation as you slide your hand through the equation. Repeat if necessary.

Third problem of Marvel Math Talk

6. **Posing the problem.** Show slide 4 in the presentation. Ask children to observe quietly for a minute and think about which of these are equations and which are not.

Note: If necessary, remind children that an equation represents when two things are equal/the same amount. Ask children to signal when they have an idea to share (for example, by holding a thumb up by their chest).

7. **Discussing the problem.** Once children signal they have an idea, ask for volunteers to share. Encourage children to explain why a specific example is or is not an equation. For example:

- $3 + 1 + = 4$ has an extra $+$.
- $= 3 + 1$ has the $=$ symbol in the wrong place.
- $4 = 4$ is an equation because there are two numbers that are the same. The numbers and the $=$ symbol are in the right place.
- $2 = 0 + 2$, and $1 + 1 = 2$ are equations because both sides equal two and the $=$ and $+$ symbols are in the right place.
- $1 + 3 = 2$ is not an equation because both sides are not the same (i.e., $1 + 3$ is 4 and 4 is not the same as 2).

Once children identify an equation and justify their idea, ask them to read the equation. Then, ask the whole class to read the equation as you slide through it.



TIPS

Frequently, children only see equations in the form $a + b = c$. This leads many children to think that this is the only possible way of representing mathematical equality, and to misinterpret the equal symbol as indicating that the "answer" to a problem always follows the $=$. Make sure to draw children's attention to different types of equations, such as $a = b + c$, $a = a$, or $a + b = c + d$.



POWords

equation (a way of representing that two things are the same.)

equal (the same; we use the $=$ symbol to represent "equal")

circle (a flat, closed, perfectly round shape, with no straight sides, and no sides, and no corners)

corners (where two lines meet [understanding of this word may include stretching out two fingers and putting them together at the fingertips])



GROW WHAT YOU KNOW

The POWord *equal* is cognate with the Spanish word *igual* [ee – gwahl]. *A equation* is cognate with the Spanish word *ecuación* [eh – kwah – syonn]. It may be helpful to children who speak Spanish to point out this connection. For example, you might say, "Hoy estamos aprendiendo sobre la palabra *igual* en Español. En Inglés es *equal*."



GROW WHAT YOU KNOW

The POWord *equal* is cognate with the Spanish word *igual* [ee – gwahl]. Also, *equation* is cognate with the Spanish word *ecuación* [eh – kwah – syohn]. It may be helpful to children who speak Spanish to point out this connection. For example, you might say, "Hoy estamos aprendiendo sobre la palabra *igual* en Español. En Inglés es *equal*."

Provides individuation and effective supports for children with identified disabilities

What does the consensus study say about it?	High-quality curricula are designed for inclusive settings with evidence-based adaptations and accommodations embedded throughout to facilitate the active engagement and learning of children with disabilities. • Children with disabilities need individualized, tailored goals and may require specialized adaptations and supports, unique resources, specific teacher competencies, and increased levels of complexity. • High-quality curricula include and provide support for teachers taking a blended approach—integrating practices that address the needs of all children in inclusive settings. That is, the needs of individual children with disabilities are integrated into the classroom’s activities and routines so that all children can be meaningfully included in each educational experience (Grisham & Hemmeter, 2017). • Children with disabilities require teaching of developmental skills across all areas of development (Barton & Smith, 2015; DEC, 2014). A growing body of evidence suggests that interventions incorporating multiple domains (social, language, cognitive) are more effective in promoting positive social outcomes and contributing to children’s future academic success (Caprara et al., 2000; Guralnick, 1992; Stanton-Chapman & Snell, 2011). • High-quality curricula enhance both social and communicative skills in children with disabilities. For example: ◦ Research suggests that children who can effectively demonstrate skills such as initiating conversation with peers, taking turns during social interactions, and adapting responses based on their peers’ communication are preferred communication partners for their peers. ◦ Research indicates that both pragmatic language and self-regulation is a positive predictor of cross-status play (i.e., interactions between children with disabilities and their typically developing peers), and that pragmatic language appeared to be more crucial for children with disabilities in fostering these cross-status interactions than it was for children without disabilities.
What are questions that can help evaluate curriculum?	• To what extent does the curriculum provide for evidence-based adaptations, accommodations, modifications, and effective supports for children with identified disabilities or developmental delays embedded throughout that facilitate their active engagement and learning? • To what extent does the curriculum provide scaffolded supports that increase opportunities for integrating children with disabilities in general education early childhood settings while effectively meeting their unique developmental needs and fostering healthy peer relationships? • To what extent does the curriculum provide strategies and approaches for teaching developmental skills across all areas of development, including skills in pragmatic language, social and communicative skills, and self-regulation?

Examples of elements of quality in Focus on Learning

Unit 2: Building Our Working City	
WEEK 2	
Science and Engineering: Structures and Shadows	
Extended from Week 1, adding new materials	
Vocabulary	light source: something light comes from opaque: not allowing light through reflect: to have light bounce off; reflective: throwing back light (from a surface) shadow: the dark image created when something blocks light translucent: allowing some light through transparent: allowing light to pass through so objects can be seen clearly
Additional Materials and Preparation	• Portrait of a Scientist slides and technology for showing them, or the South Station Tower slide, printed • a variety of materials that are opaque, translucent, transparent, and reflective (tissue paper, waxed paper, cardboard, clear cups, small mirrors, CDs, foil) Bring the flashlight and a small selection of materials to the Intro to Centers meeting, including at least one each of something opaque, translucent, transparent, and reflective. Set up technology for showing the slide, or bring the printed slide.
Intro to Centers	<i>You have started investigating light and shadows. You have used a light source and opaque blocks to make shadows. Just like you, architects investigate light with different kinds of building materials.</i> Show the Architect slide. <i>Remember Fred Clarke? Let's look at the tower he designed for the top of South Station.</i> Show the slide, South Station Tower. Pause, and then click to reveal the image of South Station. <i>South Station is built mostly with stone. Stone is opaque—it doesn't let any light through. The sun shines on it, but not through the stone.</i>

Rich vocabulary

Meaningful and engaging content: an image of a local building is used to introduce the scientific exploration

	<i>Look what material Fred Clarke decided to use for the outside of the tower...</i> Click to reveal the image of the tower. Invite children to share their observations. Highlight the shiny quality of the chosen building material. <i>Why do you think the architect chose a shiny material for this tower?</i> Harvest a few ideas. <i>You can continue to investigate light and shadows. Here are some more materials you can use.</i> Show the selection of materials. Hold each up to the light and/or shine the flashlight towards each one. Invite children to briefly share observations. As they do, affirm their experiences and observations, and supply relevant vocabulary. <i>As you build new structures in the Science and Engineering Center this week, think about the ways that light interacts with different building materials and how architects make decisions about which materials to use.</i>
During Centers	Ask children to make predictions about how light will interact with each material. Connect materials children are exploring with building materials used in the South Station Tower, in the school building, and in other structures familiar to the children. Ask children to consider why architects might choose a particular material for a particular building in a particular part of the city. Supply relevant vocabulary to describe the materials, the direction of the light source, and effects (shadow, reflect/reflection, translucent, transparent, opaque). Reinforce that shadows form when light is blocked by an object.
Differentiation ideas	• Invite children to explore their own reflection in a mirror before using other reflective materials. • Invite children to explore opaque versus transparent before introducing translucent. • Use a core board with the center language support visuals to support simple communication sentence stems (e.g., "it is reflective", "Look!", "I see little/no light," etc.) • Provide smaller sets of materials for children to explore, without building, individually or in pairs. • Provide smaller, individual boxes for one or two children to build in. • Give each child a specific role. • Use tape or clay to keep structures together while moving them.

Individuation: options for differentiation are offered to provide additional support in response to individual children's needs

	• Eliminate using the boxes and darken an area of the classroom. For further modified learning experiences, see: Science and Engineering, Structures and Shadows <i>Differentiated Access</i>
Facilitation	• What makes a shadow? • What happens to the shadow when you change the kind of material you put in front of the light? • Which materials reflect light? • Which materials block the most light? • Which materials let some light through? • What kind of building could you use this material for? • What happens if you move the light closer to / further from the structure?
Extensions	Take children outdoors to observe shadows around the school building. Identify the light source (sun) and objects creating shadows. On a sunny day, bring a selection of materials outdoors to explore the different qualities of shadows they create on the ground or on the side of the school building. On a sunny day, have children create shapes with their bodies and observe and then change their shadows. Try this again on a cloudy day and compare what happens to children's shadows. Play shadow tag, with children attempting to have shadows, rather than hands, touch each other.
Standards and Practices	PreK-LS1-3(MA). Use their five senses in their exploration and play to gather information. PreK-LS3-2(MA). Use observations to recognize differences and similarities among themselves and their friends. Practice 1: Asking Questions and Defining Problems

Clear learning goals

Notable Open Educational Resource Pre-K Curriculum

Two open educational resource curricula of note:

Focus on Early Learning

[Focus on Learning](#) is a PK3 through Grade 2 curriculum developed by Boston Public Schools (BPS). It is freely available at the link above. This curriculum implementation in BPS has been rigorously studied and shown to have a significant positive impact on student outcomes.¹



[Great First Eight](#) is an infant/toddler through Grade 2 curriculum that is in early stages of development/piloting. It is being developed by Nell Duke and a diverse expert team out of Stand for Children. It is designed specifically for children in metropolitan areas from historically underrepresented groups. The curriculum and associated PD materials can be accessed for free after creating a free account at the link above.

Approaches to Promoting Selection of High-Quality Preschool Curriculum

What are the levers states and districts can use to support use of high-quality preschool curriculum?

1	Curriculum Policy and Guidance	Assess alignment to consensus study and update preschool curriculum policy and/or guidance to address areas of misalignment
2	Curriculum Review Processes	Develop or update preschool curriculum review process to address areas of misalignment with consensus study
3	QIS/QRIS Curriculum Indicators	Assess alignment to consensus study and consider developing, adding, or modifying current QIS/QRIS curriculum indicators
4	Curriculum Incentives	Consider incentive mechanisms that could be put in place to encourage use of high-quality pre-k curriculum
5	Curriculum Implementation Supports	Consider how state- or district-provided curriculum implementation supports could be modified to align with consensus study recommendations
6	State- or District-Developed or Provided Curriculum	Consider supporting a specific high-quality pre-k curriculum and associated implementation supports for pre-k programs

Thank you

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