Introduction

In this research brief, Hanover Research outlines best practices for inclusive early childhood education (ECE) environments, including Pre-Kindergarten (or preschool) and Kindergarten programs. This brief begins with a discussion of staffing and program intensity for ECE programs before discussing appropriate curriculum and instruction in ECE, including recommendations for developing early literacy skills and providing interventions to students with disabilities.

Because the U.S. Department of Education expects ECE programs to offer inclusive environments in accordance with the Individuals with Disabilities Education Act (IDEA), this research brief includes general best practices for staffing ratios, program intensity, and curriculum and instruction for all ECE programs. This research brief also includes information on interventions and inclusion strategies designed specifically to support children with disabilities.

Recommendations

- Offer 180 days of instruction for six to six and a half hours per day in both Pre-Kindergarten and Kindergarten.
- Maintain a maximum ratio of one teacher for every nine children between the ages of 36 and 48 months and one teacher for every ten or 11 children between the ages of 48 and 60 months, with a maximum class size of 22 in Kindergarten, with lower ratios as appropriate to support varying student needs.
- Implement developmentally appropriate practices to support children from ages zero to eight within a comprehensive curriculum that addresses multiple learning domains.

Key Findings

- Full-day ECE programs are more effective than less intense programs. The most effective programs offer 180 days of instruction for six to six and a half hours per day. Full-day Pre-Kindergarten programs are especially beneficial for children who are developmentally behind their peers and dual language learners. Delaware requires Kindergarten programs to operate a full-time schedule, with a minimum of 1,060 hours of instruction per year.
- ECE programs also benefit from low child-to-staff ratios. Recommendations include a standard ratio of one teacher for every nine children between the ages of 36 and 48 months and one teacher for every 11 children between the ages of 48 and 60 months. Others recommend a ratio of one teacher for every ten children up to five years of age and one teacher for every 12 children in Kindergarten. Low child to staff ratios are especially beneficial for children with special needs and dual language learners, and lower staffing ratios than those recommended may be appropriate to meet the needs of students in an inclusion setting.
- Children benefit from developmentally appropriate practices across Grades PK-3. Teachers should continue to adapt instruction for the developmental needs of their students. Teachers implement developmentally appropriate practices by considering overall child development and learning milestones, children’s cultural and family backgrounds, and the observed needs and interests of individual children.
- High-quality early learning programs offer a comprehensive curriculum that addresses multiple learning domains. The Delaware Early Learning Foundations identify seven learning domains. Pre-Kindergarten programs address these domains through a play-based curriculum that includes a focused scope and sequence of activities for each domain. Effective collaboration among Pre-Kindergarten programs and elementary schools ensures alignment of the Pre-Kindergarten curriculum with K-12 learning standards.
- Effective inclusive ECE programs supplement the curriculum with interventions for children with additional needs, including children with disabilities. The multi-tiered systems of support (MTSS) frameworks support all children, including those with disabilities by using individual child data to provide research-supported early interventions.
Recommended Staffing and Program Intensity

Staffing Ratios

Young children benefit from low staffing ratios to support positive relationships with teachers and individual attention. The Early Care and Education Center Standards, released by the Delaware Institute for Excellence in Early Childhood (DIEEC), establish a standard ratio of one teacher for every nine preschool children between the ages of 36 and 48 months and one teacher for every 11 children between the ages of 48 and 60 months. In Grades K-3, Delaware requires a maximum ratio of one teacher for every 22 students. Other research suggests that high-quality Pre-Kindergarten programs typically require a maximum ratio of one teacher for every ten children up to five years of age. Low staffing ratios as identified as especially beneficial for Pre-Kindergarten dual language learners and children with special needs. However, to note, a 2017 meta-analysis examining three previous studies finds no significant relationship between ECE program staffing ratios and language skills.

Another 2017 meta-analysis finds that the impact of staffing ratios in ECE programs on academic and cognitive outcomes varies based on overall class size. This study finds that reducing class sizes by one child in classes of 15 or fewer children significantly improves outcomes, with no significant impact of reducing class sizes found before reaching 15 children. This meta-analysis also finds that academic and cognitive outcomes improve significantly when the overall staffing ratio declines below 7.5 children for every teacher. Based on the magnitude of effect sizes found, the authors conclude that “class sizes at or below 20 and child-teacher ratios at or below 10:1 are largely adequate for most children,” and that the effects of class size reductions below these numbers are not substantial enough to justify their cost. However, lower staffing ratios may be appropriate for children with disabilities (e.g., students with an IEP plan that require a dedicated aide).

Instructional Time

The Early Care and Education Center Standards do not appear to set a minimum amount of instructional time for Pre-Kindergarten. However, Pre-Kindergarten programs are most effective when they align with the K-12 school calendar to include at least 180 days of instruction for between six and six and a half hours each day. Delaware requires Kindergarten programs to operate a full-time schedule with a minimum of 1,060 hours of instruction per year.

The effectiveness of full-day Pre-Kindergarten depends on overall program quality. The standards for quality Pre-Kindergarten are included below, including the standards for lead teachers’ education and specialized training in ECE and child development, assistant teachers’ possession of a Child Development Associate (CDA) Credential, and ongoing professional development and continuous improvement for teachers.

<table>
<thead>
<tr>
<th>Standards for Quality Pre-Kindergarten</th>
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<tbody>
<tr>
<td>• Comprehensive early learning and development standards that are horizontally and vertically aligned, supported, and culturally sensitive</td>
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<tr>
<td>• Supports for Curriculum Implementation</td>
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<tr>
<td>• Lead Teacher Degree (BA)</td>
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<td>• Lead Teacher Specialized Training in ECE/CD</td>
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<td>• Assistant Teacher Degree (CDA)</td>
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<td>• 15 hours/year of professional development, annual individualized plans professional development plans, and coaching for lead and assistant teachers</td>
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<tr>
<td>• Maximum Class Size (20)</td>
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<tr>
<td>• Staff-Child Ratio (1:10)</td>
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<tr>
<td>• Screenings and Referrals</td>
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<td>• Continuous Quality Improvement System</td>
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Full-day preschool is especially beneficial for dual language learners and children who are developmentally behind their peers. By the end of preschool, children who attend full-day programs demonstrate stronger outcomes than children who attend half-day programs on the indicators below.

School Readiness – Skills*:
- Language
- Math
- Socioemotional development
- Physical health

School Readiness – Mastery**:
- Literacy
- Math
- Socioemotional development
- Language development

Attendance:
- Daily attendance (higher rate)
- Chronic Absences (lower rate)
*Higher levels and gains in skills
**Higher rates of performance

The National Education Association (NEA) highlights the benefits of high-quality full-day Kindergarten programs for all children. These benefits include reading and mathematics achievement gains; long-term educational gains, especially for low-income and minority students; social and intellectual benefits (including being ready for a longer school day), and better preparation for the first grade. In another study, researchers found students who attend full-day Kindergarten demonstrate significantly stronger literacy skills than students randomly enrolled in half-day Kindergarten in the same district. Children with learning and communication disorders enrolled in full-day Kindergarten demonstrate stronger scores on achievement tests than children with similar disabilities enrolled in partial day Kindergarten at the end of the Kindergarten year, though these children also experienced negative effects of full-day Kindergarten on internalizing behavior and self-control.

Appropriate Curriculum and Instruction

Curriculum and Instruction for Pre-Kindergarten

Effective instruction for Pre-Kindergarten children addresses multiple domains of social, cognitive, and personal development. Teachers in high-quality programs support children’s development of language skills, cognitive abilities, and basic skills related to math and early literacy. The Delaware Early Learning Foundations: Preschool identify the domains of learning. Pre-Kindergarten programs can support each domain by implementing a play-based curriculum that includes a focused scope and sequence of activities for each domain.

<table>
<thead>
<tr>
<th>Delaware Early Learning Foundations: Preschool Domains</th>
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<tbody>
<tr>
<td>Social Emotional</td>
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<tr>
<td>Approaches to Learning</td>
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<tr>
<td>Language and Literacy</td>
</tr>
<tr>
<td>Mathematics</td>
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<tr>
<td>My Family, My Community, My World</td>
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<tr>
<td>Creative Expression</td>
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<tr>
<td>Physical Development and Health</td>
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</tbody>
</table>

Source: Delaware Department of Education

Teachers support these domains through their interactions with children. Effective interactions combine personal warmth and responsiveness to children’s needs with a focus on higher-order thinking skills and productive use of time. The federal Preschool Development Grant (PDG) Program has set standards for high-quality Pre-Kindergarten.

**PDG Standards for High-Quality Pre-Kindergarten Curriculum**

- Developmentally appropriate practices aligned to children’s age, social and cultural background, and individual preferences and needs
- Alignment with state early learning standards
- A comprehensive curriculum model that addresses state standards, school readiness, and children’s social emotional needs
- Cultural responsiveness to families’ cultural backgrounds and home languages
- Quality evidence that the curriculum positively impacts outcomes for children.

Source: AEM Corporation

The National Association for the Education of Young Children (NAEYC) provide an overview of the importance of focusing on social and emotional health in preschool, explaining how this leads to greater happiness, motivation to learn, positive attitude towards school, class participation, and higher academic performance. To foster social and emotional health, teachers can organize a “material-rich environment to stimulate social interactions among children” and focus on two practices: building trusting relationships and conducting intentional teacher. To build trusting relationships, it is essential to go beyond being nice and engaging to consistently offering warmth, affection, respect, and caring; to teach intentionally, teachers should incorporate children’s books, activities, coaching in real-time, affectional praise and provide cues, as well as model behavior.

Profile – NC Pre-K

The North Carolina Pre-Kindergarten Program (NC Pre-K) provides an example of a statewide Pre-Kindergarten aligned with best practices for intensity and instruction. The NC Pre-K Program Requirements ensure alignment with the PDG standards for quality Pre-Kindergarten. All programs supported by NC Pre-K offer 6.5 hours of instruction 180 days per year. The program maintains a maximum class size of 18 children and a maximum ratio of one teacher for every nine children. Each classroom is staffed by a lead teacher who holds or is in the process of earning a state certification in ECE and an assistant teacher who holds or is in the process of earning an associate’s degree in ECE or a CDA Credential.

Teachers in NC Pre-K classrooms align planning and instruction with the North Carolina Foundations for Early Learning and Development, which address the...
domains shown in the next figure. Each program uses one of 17 curricula approved by the North Carolina Child Care Commission. Approved curricula are evidence-based, comprehensive, and incorporate a reading component.

**North Carolina Foundations for Early Learning and Development**

**Approaches to Play and Learning**

**Emotional and Social Development**

**Health and Physical Development**

**Language Development and Communication**

**Cognitive Development**

*Source: North Carolina Department of Health and Human Services*

NC Pre-K has demonstrated positive effects on academic achievement for participating children. A randomized control trial examining children who participated in NC Pre-K during the 2017-2018 school year finds positive effects of participation on vocabulary and word recognition skills at the end of the Pre-Kindergarten year. A previous evaluation examining children who participated in NC Pre-K during the 2015-2016 school year finds positive effects on math skills and executive functioning, but not literacy skills, at the end of Kindergarten.

**Curriculum and Developmentally Appropriate Practices in Grades K-3**

The curriculum in Kindergarten becomes somewhat more academic than the Pre-Kindergarten curriculum. In Delaware, the Common Core State Standards (CCSS) address learning standards in math and English language arts (ELA) for Grades K-12. To note, Kindergarten instruction has increasingly focused on academic outcomes in recent years. Teacher surveys find that Kindergarten instruction shifted away from child-directed activities toward standards-based teacher-led instruction between 1998 and 2010. Teachers have also increased expectations for skill development before and during Kindergarten, particularly the expectation that children will be able to read by the end of Kindergarten.

However, the curriculum in Grades K-3 should continue to incorporate developmentally appropriate practices (DAPs), including an appropriate balance of student-directed and teacher-directed activities. Teachers implement DAPs by considering overall child development and learning milestones, children’s cultural and family backgrounds, and the observed needs and interests of individual children. The following figure presents guidelines for implementing developmentally appropriate practices to support children between birth and age eight.

**Create a caring community of learners**

**Teach to enhance development and learning**

**Plan curriculum to achieve important goals**

**Assess children’s development and learning**

**Establish reciprocal relationships with families**

*Source: National Association for the Education of Young Children*

**Support Kindergarten Transitions**

Children need support for the transition from Pre-Kindergarten to the more structured environment and increased academic expectations of Kindergarten. Successful transitions require collaborations among children and their families, peers, Pre-Kindergarten and Kindergarten teachers, and the community. These collaborations support children in building continuity across the transition from Pre-Kindergarten to Kindergarten in alignment with the principles outlined below.

**Foster relationships as resources**

**Promote continuity from preschool to Kindergarten**

**Focus on family strengths**

**Tailor transition practices to individual needs**

**Form collaborative relationships among the key players**

*Source: AEM Corporation*

**Developing Early Literacy Skills**

Teachers can incorporate instructional strategies and curriculum supplements that support the development of early literacy skills. The most effective early literacy programs incorporate a comprehensive approach to skill development that balances child-directed activities with explicit skill instruction. These programs develop early literacy skills through the following strategies:
Inclusion for Students with Disabilities

The IDEA requires Pre-Kindergarten programs to provide inclusive environments for children with disabilities. The IDEA also provides support for the inclusion of disabilities in K-12 settings through the least restrictive environment (LRE) requirement.

The IDEA’s inclusion mandates rest on a strong body of research establishing that inclusion supports access to high-quality curriculum and instruction for children with disabilities, leading to improvements in academic achievement and social engagement. Including children with disabilities in ECE improves the development of literacy skills such as print awareness and oral language. Inclusion provides children with disabilities opportunities for social interactions with peers that support the development of both language and social skills.

Recommendations for increasing inclusion in ECE settings at the local level include the following:

- Partner with families
- Adhere to legal provision of supports and services in inclusive settings
- Assess and improve the quality of inclusion in early childhood programs
- Review and modify resource allocation
- Enhance professional development
- Establish an appropriate staffing structure and strengthen staff collaboration
- Ensure access to specialized supports
- Develop formal collaborations with community partners

Effective early childhood programs support inclusion of students with disabilities, as well as dual language learners and students with physical or behavioral health needs, by modifying instruction or the program environment.

Core Components of Inclusion for Children with Disabilities

**Access**
- Children with disabilities have access to a wide range of learning opportunities through instructional modifications such as Universal Design for Learning (UDL) and technology supports

**Participation**
- Children with disabilities receive individual accommodations that enable them to participate in activities with typically developing peers

**Supports**
- Prekindergarten programs receive systemic supports such as ongoing professional development and collaboration among stakeholders

Although children with disabilities derive some benefits from enrolling in inclusive ECE programs, additional interventions are often necessary for children in Grades PK-3 to realize the full benefits of inclusion for children with disabilities. These supports may include instructional interventions and support, such as additional supports provided by special education teachers or paraprofessionals. Services provided to children with disabilities, like supplementary services and supports for school staff, should be described in an IEP.

Children with disabilities in Grades PK-3 often require more intensive instruction than their typically developing peers to generalize and maintain skills. Unfortunately, research examining the impacts of commonly used Pre-Kindergarten curricula on children with disabilities is limited. However, research does find strong support for programs developed specifically for children with disabilities, including the Teaching Early Language and Literacy (TELL) curriculum for language and literacy skills and The Incredible Years curriculum for behavioral outcomes and social skills.

Research also supports the use of targeted interventions for children with disabilities learning in inclusive Pre-Kindergarten settings. Low-performing children who receive tutorial interventions within Pre-Kindergarten programs demonstrate improvements in mathematical and numerical knowledge. Research-supported intervention strategies to support Pre-
Kindergarten children with disabilities in inclusive classrooms include:

### Naturalistic Approaches and Embedded Instruction
- These interventions incorporate skills instruction into a child’s natural environment.

### Peer-Mediated Strategies
- These interventions teach typically developing children ways to interact with their peers with disabilities in ways that promote skill development.

### Teacher-led Interventions that use Stories
- These interventions use stories to describe desired behaviors in specific situations.

Source: National Center for Children in Poverty

### Multi-Tiered Systems of Support

ECE programs can provide interventions within a multi-tiered system of support (MTSS) framework. A strong research base supports the use of MTSS models to support students with disabilities in Grades K-12. For example, the Positive Behavioral Interventions and Supports (PBIS) model has demonstrated strong impacts on behavioral outcomes and social skills for K-12 students with disabilities, as well as improvements in school climate for all students. Effective PK-3 programs incorporate the core MTSS principles.

### Pyramid Model for MTSS in ECE

Source: Infants and Young Children

### Profile – Granite School District

Granite School District in Utah has been recognized by the U.S. Department of Education for its inclusive preschool programming. Pre-Kindergarten programs in Granite School District teach a comprehensive curriculum aligned with state early learning standards. The district maintains a maximum ratio of ten children for every staff member, and each classroom includes the following:

Staff members participated in data-based professional development every month. Granite School District created an inclusive Pre-Kindergarten program by combining an existing preschool special education program with previously separate programs funded by the Title I grant program and parent tuition. The district uses braided funds to support the combined program.

As part of the transition to an inclusive environment, Granite School District has redefined the role of special education Pre-Kindergarten teachers. These teachers now collaborate with general education teachers using co-teaching or consultation models. Granite School District limits the use of self-contained classrooms for Pre-Kindergarten students, and all self-contained classrooms are located in the same buildings as inclusive classrooms to maximize opportunities for children with disabilities to interact with typically developing peers.
Granite School District also invested in stakeholder engagement to support its inclusive preschool program. Initially, teachers expressed concern about the impact of inclusion on their roles, while parents expressed concerns about the impact of inclusion on curriculum and instruction. Granite School District addressed these concerns through a series of listening sessions. During listening sessions, district staff members clarified misconceptions and worked with stakeholders to identify solutions to stakeholder concerns.70
## Appendix A: Proposed Research Agenda

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<td>Demographic Analysis &amp; Review of Special Education Enrollment Data</td>
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<th>POTENTIAL FOLLOW-UP PROJECTS</th>
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Project Evaluation Form

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Endnotes

7 Ibid., pp. 423–424.
13 Chart contents taken verbatim from: Ibid.
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24 Ibid.
26 {Citation}
27 {Citation}
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35 “Delaware Common Core State Standards,” Delaware Department of Education. http://www.doe.k12.de.us/site/default.aspx?PageType=3&ModuleInstanceID=1125&ViewID=5C8B25C6-C8F8-4B5D-923B-8A7C70A93DDA&RenderLoc=0&FlexDataId=25318&PagedId=809
38 “3 Core Considerations of DAP.” National Association for the Education of Young Children. https://www.naeyc.org/resources/topics/dap/3-core-considerations
40 Chart contents taken with minor alterations to mood from: Ibid., pp. 17–24.
48 Ibid., pp. 37–39.
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59 Ibid., pp. 196–197.
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