Virginia's Smart Beginnings Kindergarten Readiness Assessment Pilot

Report from the Smart Beginnings 2013/14 school year pilot of Teaching Strategies GOLD® in 14 Virginia school divisions

Prepared for the Virginia Early Childhood Foundation

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FULL REPORT

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Executive Summary

Introduction...

As a business-led public-private partner with a statewide network of local partners, the Virginia Early Childhood Foundation is committed to discerning gaps in Virginia's school readiness and serving as a catalyst to find innovative solutions.

Consistent feedback from communities, schools and families across the state has indicated that having more information about children's readiness for Kindergarten is needed to support their optimal growth and to understand the effectiveness of their early care and education experiences. On the local level, teachers are burdened with assessment responsibilities, yet may still feel that they don't have the needed data to effectively plan instruction and support individual students' progress. At the state level, the Standards of Learning Innovation Committee is grappling with assessment and accountability issues, charged by legislation that calls for a reduction of the number of tests amid growing distaste for standardized testing. Nationally, educators are tackling assessment reform, seeking more effective ways to ensure and measure student growth.

The Pilot...

To address these challenges and opportunities in a way that supports local school systems by testing a potential option for effective assessment, VECF conducted a Kindergarten readiness assessment pilot in the 2013-14 school year. Based on input from a diverse group of local-level stakeholders and a team of experts including researchers from the University of Virginia (UVA), Virginia Polytechnic Institute and University (VT); Virginia Commonwealth University (VCU); local school division and Smart Beginnings leaders; and Virginia Department of Education (VDOE) staff, VECF piloted the implementation of Teaching Strategies GOLD,® a multi-dimensional, observation-based assessment of children's Kindergarten readiness and skills throughout the year. GOLD was implemented in 79 classrooms in 14 Virginia school divisions, in a pilot that was designed to ascertain the feasibility of implementing this type of assessment in Virginia's classrooms.

Findings...

Results showed that GOLD is aligned with most teachers' personal philosophies of Kindergarten assessment, and that teachers value the type of information available from GOLD. Further, teachers appreciated having information about children's status in the context of a learning continuum and in

comparison with widely-held expectations for kindergarten children, in addition to status results typically available with other assessments. The pilot also illuminated challenges associated with implementing observation-based assessments in Virginia's Kindergarten classrooms, and resulted in suggestions for supporting teachers and leaders in this process:

- The majority of teachers reported value in the multi-dimensional nature of GOLD. They reported a firm belief in the importance of establishing a learning environment that focuses on multiple dimensions of learning and development associated with children's later school and life success. Teachers further reported that their current environments do not seem to value such whole-child environments or assessments, hyper-focusing on academics alone. There are few incentives to utilizing whole-child assessments in classrooms.

- The version of GOLD used in the pilot had a continuum of learning objectives from birth to Kindergarten, but did not include objectives for first grade or higher.[1] Yet many children in the pilot met or exceeded Kindergarten learning expectations by mid-way through the school year. In choosing any assessment for Kindergarten, it is important to ensure that teachers can assess children across the learning continuum. Teachers and administrators were interested in vertically-aligned assessment that would, at the minimum, span preK to 1st grade.

- Through surveys and interviews, it became clear that pilot classrooms and teaching expectations were not aligned with an instructional approach that requires children to demonstrate skills in realistic settings and requires teachers to observe and document children's levels on a learning continuum. Teachers reported that they were expected to deliver direct instruction to young children in whole or small groups throughout the day, and that it was difficult to deliver instruction and take notes on children's levels simultaneously. To successfully implement observation-based or other new assessments, it is important to ensure that teachers have aligned curricula, pedagogy, and the time and support to ensure that lesson plans and learning activities are aligned with the new assessment approach.

- Consistent, reliable use of observation-based measures will require additional training and ongoing support to ensure that teachers can update their instructional strategies and the learning environment to use observational methods reliably and with fidelity. During the pilot, teachers' responses to surveys, information provided during interviews, and GOLD data suggested that the two-day Teaching Strategies-provided training on the use of GOLD was necessary but not sufficient to enable teachers to use GOLD reliably and with fidelity throughout the school year. The pilot results suggested that reliability improved over the course of the year.

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[1] During the Smart Beginnings KRA pilot year, Teaching Strategies was in the process of finalizing a version of GOLD that includes learning objectives for children through grade 3.

However, results also point to a need for pre-service and in-service skill-building for teachers to successfully use observation-based assessment.

- During the pilot, the use of GOLD was added to teachers' existing responsibilities without taking anything away. This led to redundancies in assessment, and in some communities, excessive burden on teachers. It is critical that when determining a new assessment strategy, it is developed strategically, and avoids layering new assessments on top of old without consideration for assessment purpose.

Recommendations………

Moving forward with Kindergarten assessments, it is recommended that Virginia take steps toward creating a continuum of early learning and support structures, to include assessment systems that facilitate teaching excellence, accelerated learning, and children's successful development. With funding challenges at the state and local levels, a productive first step could be a cohesive focus on creating this continuum in communities with chronically underperforming elementary schools. Designing a pilot for these communities should include aligned and coordinated curriculum, lesson planning, comprehensive assessment practice, and professional development and learning communities in classrooms from pre-K to third grade. Piloting a seamless process in targeted communities and reaching the highest-need students could leverage federal funding opportunities, reduce strain on the state's financial commitment during budget shortfall, and inform the ongoing review and reform of Virginia's assessment system.

Introduction

The Virginia Early Childhood Foundation (VECF) is a non-partisan, public-private partnership formed in 2005 to provide substantive leadership and drive innovative initiatives to ensure that Virginia's children enter Kindergarten healthy and ready to learn. A significant component of VECF's activities is to support a statewide network of Smart Beginnings collaborative partnerships that convene parents and leaders from K-12 education, the child care community, health, local government, family support agencies, social services, higher education, faith leaders, and the business community to build the capacity of local communities to create optimal environments for children's growth and development.

Since the inception of Smart Beginnings, VECF has received feedback from communities, schools, and families asserting that they need more information about children's readiness for Kindergarten. Local stakeholders need this information to support children's optimal growth and to understand the effectiveness of children's early care and education experiences. Currently, state funds support access to information about children's early literacy skills through local use of PALS (Phonological Awareness Literacy Screening), but no consistent information is available about children's readiness in other domains of learning and development. Nonetheless, research suggests that readiness in other domains, such as cognitive development, social-emotional and mathematics skills, are predictive of children's school success (for example, see Snow, 2007). Having access to a comprehensive measure can help teachers understand levels of mastery and enable the targeted strengthening of the diverse and developmentally-important skills that children need for school and life success.

Virginia communities are not alone in their interest in requesting Kindergarten readiness measures. In their report on pre-Kindergarten and Kindergarten assessments, the Center on Enhancing Early Learning Outcomes (CEELO) reported that state policy related to Kindergarten assessments was in "flux" in 2011/12, and, that by December 2013, a review of state websites showed that a number of states were in the process of updating Kindergarten readiness measures. States vary in their status, with some beginning the process of defining readiness and others reviewing, changing, or implementing new measures in Kindergarten (Schilder & Carolan, 2014).

While the need for more information about children's school readiness is clear, a variety of contextual factors have affected Virginia's ability to add any new measures to local testing requirements. Already, teachers are burdened with assessment responsibilities, although the specific assessments and schedule used in Kindergarten vary widely among schools and divisions. Further, despite having local assessment data, teachers may still feel that they do not have the specific data needed to effectively plan instruction and support individual students' progress. In addition, at the state level, the Standards of Learning Innovation Committee is grappling with assessment and accountability issues and the growing distaste for standardized testing, charged by legislation calling for reduction of the number of tests. Nationally, educators are tackling assessment reform, seeking more effective ways to ensure and measure student growth.

Kindergarten Readiness Assessment pilot

While most of the attention at the state and national level has been focused on assessment and accountability at third grade and beyond, VECF has targeted Kindergarten assessment for several reasons. There is growing recognition of the importance of third grade reading proficiency as a powerful predictor of school success. Yet student performance in third grade is shaped by experiences and interventions beginning in the earliest years of life, and persistent achievement gaps among groups of students begin long before third grade. Like the critical transition points from elementary to middle and middle to high school, supporting children from home or child care or preschool into the K-12 system requires careful navigation. Kindergarten is an important "hinge" between the early childhood years and elementary school, and effective assessment during the Kindergarten year can provide significant information about the effectiveness of children's prior experiences. This assessment-based information can inform educators regarding children's relative strengths and challenges, and thereby support their success on the elementary path ahead.

While there is broad-based interest in gathering more information about children's readiness for kindergarten, there are also ongoing challenges related to understanding options for integrating informative and useful assessment into local school systems so as to improve teachers' ability to support children's success navigating the path in elementary school. To address these needs, VECF partnered with 14 school divisions to conduct the Virginia's Smart Beginnings Kindergarten Readiness Assessment (KRA) pilot project during the 2013/14 school year.[2]

Overview

The pilot was aimed at assessing the feasibility of incorporating a multi-dimensional assessment into Kindergarten classrooms that would a) inform efforts that focus on strengthening children's early learning experiences, and b) give teachers the information needed to provide children with an appropriate learning environment—to meet them where they are and move them on the path to success in multiple academic and developmental domains.

The pilot approach was shaped by feedback from local-level stakeholders and the work of a team of experts including researchers from UVA, VT, and VCU; local school division and Smart Beginnings leaders; and Virginia Department of Education (VDOE) staff. Based on input from Smart Beginnings stakeholders and early childhood researchers and educators, and information available from other states' experiences, VECF chose to pilot *Teaching Strategies* GOLD®. GOLD is a tool that supports a formative assessment process and provides teachers and administrators with a summary of children's status along a developmental continuum at agreed-upon checkpoints throughout the year. This assessment is currently being piloted or is in use in several states, including Washington, New Jersey, Colorado, and Hawai'i.

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[2] Funding for this grassroots pilot was provided by private, corporate, and foundation donors, with additional support from local school division contributions and federal school improvement funding through the VDOE.

In 2013, VECF secured commitments from 14 school divisions to participate in the 2013/14 pilot. Within these 14 school divisions, there was participation from:

- 32 schools
- 79 teachers
- Approximately 1,440 Kindergarten children

Participating school divisions represent urban, suburban, and rural communities in Virginia. Schools serve diverse learners, with some serving relatively large and others serving relatively small populations of English language learners and economically disadvantaged students. Teacher experience ranged from novice (first- and second-year Kindergarten teachers) to veteran (30 years or more). Appendix A lists participating schools and divisions.

Prior to beginning the pilot, a team of technical experts and educators provided input to VECF on the questions they hoped the pilot could answer. Based on this information, VECF and the evaluator developed an evaluation plan that focused on answering the following questions:

- To what extent do schools, teachers, and students gain value from use of an authentic, observation-based assessment in Virginia's Kindergarten classrooms?
- To what extent is Teaching Strategies GOLD an instrument that has potential for reliable use in Virginia's Kindergarten classrooms?
- What factors must be considered in terms of feasibility of implementation of a new assessment in Virginia's Kindergarten classrooms?

Teaching Strategies GOLD assessment system

The GOLD assessment system is designed to facilitate teachers' ability to conduct developmentally-appropriate, ongoing, observation-based assessment during regular, everyday classroom activities throughout the school year. This authentic assessment approach is different from paper-based tests or one-on-one task-based approaches often used in public schools. Rather than separate assessment time from the teaching and learning process, GOLD asks teachers to document children's skills and abilities on a developmental continuum based on each child's demonstration of skills in the classroom environment. When using GOLD, teachers document children's developmental levels on an ongoing basis and provide ratings of children's status by finalizing "checkpoints" multiple times per year.   In theory, this approach offers teachers more teaching time than traditional paper-pencil and one-on-one assessment methods, and also provides children with the opportunity to demonstrate content, concept, and skill mastery in a more realistic environment. As well, it offers teachers an opportunity to reflect on student learning, adjust practice if needed, and provide students with feedback on how they can improve their own learning. To implement this approach with fidelity, and to use the results to inform the teaching and learning process, it is important for teachers to have access to curricula and lesson plans that are intentionally designed to embed learning opportunities into the instructional environment in ways that afford children the chance to demonstrate their level of mastery of the

learning objectives within the regular classroom environment. The complete GOLD tool includes 38 learning objectives that align with the knowledge, skills, and abilities that are predictive of children's school success. Teaching Strategies organizes these learning objectives into four developmental areas (social-emotional, physical, language, and cognitive), and five focus areas on content learning (literacy, mathematics, science and technology, social studies, the arts), and English language acquisition.

After each checkpoint is complete, GOLD provides teachers and administrators with scaled scores in each domain of learning and development. The tool also provides information about children's status based on their scaled scores. In the fall, GOLD provides data for each child determining whether they met the *Kindergarten Readiness Benchmark* for each domain. The Kindergarten Readiness Benchmark indicates whether children met the expectation of what they should know and be able to do upon *arriving* at kindergarten, and is aligned to preK learning standards. After each checkpoint, GOLD also provides a *Widely Held Expectations* (WHE) indicator for each domain. The WHE indicates whether children met objectives for what children should know and be able to do by the time they *leave* kindergarten.

Teaching Strategies' analyses of data collected nationwide suggest that GOLD can be a valid and reliable tool for ongoing assessment (see Box 1). For purposes of the pilot, Virginia educators worked with Teaching Strategies content experts to review and determine GOLD's alignment with Virginia's Kindergarten and preschool learning standards, which are the *Standards of Learning* and the *Foundation Blocks for Early Learning*. Through this process, Teaching Strategies customized the VECF pilot version of GOLD to align with Virginia standards and to ensure that the resulting tool retained adequate reliability on each learning and developmental area.

Box 1: **Summary of psychometric properties in Teaching Strategies GOLD**

- Internal consistency, measured by Cronbach's alpha (α), $\geq$ 0.957 for each domain of learning and development (Lambert, Kim, Taylor & McGee, 2010).
- Inter-rater reliability, α $\geq$ 0.859 for each domain (Lambert, et al., 2010).
- To assess whether GOLD is measuring the intended constructs (i.e., assess validity) Teaching Strategies has compared children's GOLD scaled scores in each domain with other diverse assessments. Correlations were low to moderate in expected domains (see Teaching Strategies GOLD® Assessment System, 2013). Correlations were estimated with measures such as the Preschool and Kindergarten Behaviors Scales (PKBS, Merril, 2003); Peabody Picture Vocabulary Test, Fourth Edition (PPVT®-4; Dunn & Dunn, 2007) , Woodcock-Johnson III NU Tests of Achievement (W-J III, Woodcock, McGrew, & Mather, 2007), pencil tapping (via the Preschool Self-Regulation Assessment, Smith-Donald, Raver, Hayes, & Richardson, 2007), and Head-Toe-Knees-Shoulders Task (HTKS) (Ponitz, McClelland, Matthews, & Morrison, 2009).

The customized version of GOLD included measures of children's knowledge, skills, and behavior related to 23 learning objectives in the following areas:

- Social–Emotional

- Physical
- Language
- Cognitive
- Literacy
- Mathematics

The selected objectives for development and learning used in this pilot are shown in Appendix B.

Context of the evaluation

As they finalized preparations for 2013 summer training and fall implementation, VECF and the pilot implementation team became aware of relevant contextual factors in the pilot communities that had the potential to influence the pilot. Most notably, there was remarkable turnover in key leadership positions in the pilot divisions. Working with divisions over the 1½ year term of the pilot planning and implementation, there was turnover among the key pilot contact, superintendent, and/or chief academic officer in almost every one of the 14 participating divisions. This was concurrent with fairly typical change caused by teacher retirement, shifts to other grades or shifts to non-pilot schools. While the evaluation plan did not have a specific focus on leadership, this churn likely influenced schools' and teachers' ability to fully integrate GOLD into children's learning environments.

Other local contextual factors also impacted implementation. As budgets were cut across Virginia, potential supporting resources, such as teacher assistants, impacted the initiative. For example, one participating division lamented that because of budget challenges, all assistant teachers in Kindergarten classes had been cut back to part time, seriously impacting the capacity of lead teachers. Also, in almost every case, pilot participation resulted in *adding* to teachers' already-full expectations related to curriculum, lesson planning, and assessment; the GOLD pilot was layered on top of these local requirements with limited support for adjustments.

> *Other outside curriculum come first. If it was just GOLD it would be easy simple and very user friendly. However, when paired with [other curricular and assessment requirements] it becomes very overwhelming.*
>
> *Teacher, KRA pilot, 2013/14*

During the pilot planning year, some administrators had hoped to eliminate existing assessment practices and replace them with GOLD in participating Kindergarten classrooms, at least during the pilot year. As it turned out, teachers throughout the pilot schools continued with their schools' existing assessment and screening practices and voluntarily added this new assessment. During the same time period, teachers in every grade in every public school in Virginia were working to meet new teacher evaluation objectives, including measuring student progress over the course of the year with existing assessments or "SMART" goals, which added additional requirements to teachers' already full plates. Recognizing these pressures, and learning from other

states' experience exploring Kindergarten assessment, VECF expected to encounter teacher fatigue and dissatisfaction with the assessment over the course of the year.

Despite challenging dynamics in Kindergarten classrooms during the 2013/14 school year, participating teachers demonstrated eagerness to serve as pioneers in this field test of an observation-based assessment. This is a testament to teachers' commitment to their students' success and to having the necessary tools to teach and plan well.

GOLD implementation in VECF KRA pilot

KRA pilot activities began during the summer of 2013. During that time, teachers participated in a two-day training on using the GOLD assessment and framework in their classrooms. Teaching Strategies delivered the training program in four geographic regions in Virginia to accommodate teachers across the state. For purposes of the pilot, training included Teaching Strategies' standard 2-day training plus an added component aimed at helping teachers understand good observation techniques and accurate ratings.

At the end of the training, teachers were asked to complete the Teaching Strategies-provided inter-rater reliability (IRR) assessment. Teachers had the opportunity to begin the IRR assessment process at the end of the 2-day training, and were asked to pass the test in all five GOLD domains of learning and development before completing the fall checkpoint.

Participating teachers were asked to use GOLD during their regular classroom activities throughout the school year. For pilot purposes, teachers were asked to document students' developmental levels by completing and submitting GOLD checkpoint evaluations three times during the school year—fall, winter, and spring.

In support of the pilot, each school division committed a central office administrator as the KRA pilot coordinator who worked with teachers and acted as a liaison to VECF. VECF also employed a project coordinator who coordinated trainings, supported teachers and administrators in meeting participation expectations, and served as a resource for teachers and administrators throughout the pilot. The evaluation was conducted independently, and included review and approval from an Institutional Review Board. VECF leadership, the pilot coordinator, and evaluator worked closely to coordinate implementation and evaluation activities.

Seventy-nine (79) teachers participated in the two-day training during the summer of 2013. In the fall, 75 teachers completed the GOLD checkpoint, although six teachers did not complete the fall literacy and mathematics areas due to technical difficulties. While participating divisions experienced significant changes in leadership, there was minimal teacher attrition during the pilot year. In the spring, 71 teachers completed the GOLD benchmark. Teachers who left during the course of the pilot were on medical leave, retired, resigned, or were reassigned to another grade level during the school year.

Data collection

The pilot evaluation plan included several data sources. The evaluation included data from the GOLD assessment ratings, which Teaching Strategies provided for each of the fall, winter, and spring checkpoints. When providing data for this pilot, Teaching Strategies prepared a data set that included de-identified child-level data from GOLD, including ratings on each learning objective, scaled scores by domain, Kindergarten Readiness Benchmark by domain (fall only); and the Widely Held Expectations indicator by domain (fall, winter, spring).

The evaluation team also collected data directly from teachers and administrators. Following each checkpoint, teachers received a personalized link to an online survey asking questions about their experiences using GOLD. Teachers and local administrators also had the opportunity to participate in interviews after the second checkpoint.

The final source of data was provided by the Virginia Department of Education (VDOE). VDOE provided children's demographic data (i.e., race/ethnicity, economically disadvantaged status), program participation (i.e., for students with disabilities, English language learners) and fall PALS K data for each child in the pilot. Data were de-identified prior to analysis.

Implementation results

A primary goal of the evaluation was to learn about teachers' use of GOLD in Kindergarten classrooms. Specifically, the evaluation team designed the survey and interview protocols to better understand how teachers used GOLD, whether they valued the information they learned from the measure, and how well it aligned with classroom practices. In addition, the surveys asked teachers to provide information related to practical matters, such as the amount of time it took to use GOLD in their classrooms.

This section of the report summarizes findings and implications of the results related to teachers' perspectives on GOLD's value and its implementation in Virginia's Kindergarten classrooms. In general, results showed that GOLD aligns to the vast majority of participants' teaching philosophies (86 percent), and nearly all teachers recognized at least some potential value of using GOLD in their classrooms. Nonetheless, it was difficult to implement GOLD with fidelity in Kindergarten classrooms. The following summarizes the pilot findings related to implementing GOLD in Virginia's Kindergarten classrooms.

GOLD's value in Kindergarten classrooms

The following information is based on information that teachers reported via surveys and interviews, with additional information provided from administrator interviews.

Focusing on the whole child

The most common benefit teachers reported from GOLD was the continuous reminder to learn about and understand their Kindergarten children from the perspective of multiple domains of learning and

development. This in turn encouraged teachers to do their best to embed instructional activities into daily teaching routines to focus on children's social-emotional and cognitive development, which they reported supports children's success in academic content areas. For example, one teacher commented that having GOLD's social-emotional learning objectives provided information about the goals she needed to work on with her students, such as taking the time to teach children how to join a game, how to share, and how to take turns, etc. She then could readily embed activities to build these important skills into academic (e.g., mathematics) lesson plans. Another commented that GOLD helped focus on observing more areas of children's learning such as how children hold their pencils, how they're running around on the playground, etc., which led to changes in her teaching approach.

While there was near-universal agreement that most GOLD domains were important for children, teachers did not have consensus about the value of the physical domain relative to the perceived value of other domains, particularly the social-emotional domain.   While teachers recognized the importance of physical and motor skills, many considered it the physical education teachers' responsibility to screen, monitor, and facilitate development of children's physical and motor skills, with less of a direct focus in core classroom routines.[3] In fact, some classroom teachers asked the PE teachers for assistance during the pilot, to capitalize on their expertise.

Having clear information on the developmental continuum and future learning expectations

Several teachers commented on the value of having clear expectations about children's progress along a readily-accessible continuum for both academic and non-academic learning domains. Several teachers used the learning objectives and complementary instructional materials that focused on the development of writing skills as an example of how they used this information. Teachers described value in having access to systematic, ordered learning objectives to move each child forward on the writing continuum. Grounded in developmental learning trajectories, the learning objectives were at a level of granularity that could directly inform daily/weekly lessons for each child. For some teachers, these ordered objectives helped validate an existing teaching approach, and continuously reminded them not to skip important steps in the learning process—even if this meant spending more time with some students on particular skills.   For others, the information was useful in refining lesson plans to ensure students were given opportunities to focus and succeed at each developmental stage.

Some teachers also reported that seeing the developmental continuum in multiple learning and developmental domains strengthened their understanding of the knowledge, skills, and behaviors that are considered at, above, and below typical for Kindergarten children. This was a particularly prominent comment from teachers working in schools serving relatively large concentrations of children at risk for academic challenges, such as those who live in poverty. Many of the teachers in these schools appreciated having

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[3] Since 1994, schools have been required to screen all Kindergarten children for fine and gross motor functions within 60 days of enrollment. The assessment is typically completed by the physical education teacher, and children are referred for additional diagnostics and services as needed. Kindergarten teachers support this process.

access to normative data on all learning objectives. They reported that this helped them understand where their children were performing compared to children from other communities, and helped them to recognize each child's strengths. In addition, based on the developmental trajectories, these teachers often realized that the children in their classrooms were not actually behind the norm in all areas of learning and development.

Using GOLD to inform instruction

Teachers reported using GOLD for a variety of purposes. In the fall, about one-third of teachers reported that the data from GOLD were useful for learning about individual students in their classes, and more than half (55 percent) reported that the information they learned from GOLD was useful for instructional planning. Teachers' views of the usefulness and reported use of GOLD to inform instruction decreased somewhat over the course of the year. Information collected through the survey and from interviews suggested that GOLD's value decreased for two key reasons. First, the version of GOLD used in 2013/14 included the developmental levels that describe what children are expected to know and be able to do with regard to each objective by the end of Kindergarten, but it did not include developmental levels for children who were performing above widely-held expectations for Kindergarten. Nonetheless, by the winter checkpoint, GOLD data suggested that more than half of the children in the pilot had already met or exceeded Kindergarten learning expectations, and were ready to move on to first grade levels. The second reason is related to the overall implementation challenges, including reported redundancies with other assessments, lack of time to observe children demonstrating their knowledge and skills, and limited alignment with lesson plans and expectations. These challenges are described in more detail in the next section of this report, *Implementation Challenges.*

Using GOLD's resources

Throughout the pilot, teachers added GOLD to existing curricular, assessment, and scheduling requirements. This resulted in several teachers reporting that they did not have the time or incentive to fully leverage GOLD resources. However, teachers who reported accessing the instructional resources available found them useful. Teachers who looked for instructional resources reported that they were readily accessible, making it easy to "grab" fully developed lesson plans that aligned to learning objectives.

During interviews, several teachers reported that they might have used the GOLD resources more fully with additional training or time. However, many of these teachers also found the GOLD online system challenging to use without direct and focused support for finding the resources they needed.

Implementation challenges

Despite the majority of teachers reporting that GOLD was aligned with their personal teaching philosophies, nearly all teachers reported that GOLD was challenging to implement. In the fall, about one-third of teachers reported that using GOLD was somewhat to extremely easy. This was expected, as the implementation was new for all pilot teachers, and as was learned in the pilot, the formative assessment process is different from approaches that teachers currently use. By the spring, nearly half of the teachers reported that GOLD was somewhat to extremely easy to use, and one-third of pilot teachers reported that they had sufficient time in

the spring to enter data into GOLD for pilot purposes. While GOLD implementation became easier with experience, throughout the pilot year, teachers reported significant barriers to implementing GOLD that would likely impact their ability to use any type of comprehensive, observation-based assessment on a regular basis. Each of these is discussed below.

GOLD took time to implement

The most common challenge that teachers reported, by far, was finding the time within the structure of their current teaching routines to observe children, document children's levels on the continuum, and enter children's levels in the GOLD online data system. The majority of teachers (54-69 percent across the three checkpoints) reported spending 1 to 5 hours a week conducting observations and collecting data for the pilot, although some teachers reported that GOLD required more than 10 hours per week (23 percent of teachers in the fall and 1.7 percent in spring). While this may seem like a significant amount of time, 60 percent of the teachers also reported that at least half of their time spent observing or collecting data for GOLD was *also* part of another data collection/assessment requirement already in place.

GOLD was added to teachers' already full day, without removing other assessment requirements

Another factor influencing teachers' implementation of GOLD was existing assessment requirements that continued during the pilot year. Many teachers in the pilot reported having local requirements to administer assessments in mathematics and English/language arts in addition to GOLD, and, as such, reported that GOLD was often (but not always) redundant with local requirements. The amount of assessments that teachers were required to use varied from school to school, with some schools only using PALS K, and others having a continuous cycle that included multiple progress and benchmark measures of mathematics and English/language arts skills.

While use of other assessments led to teachers feeling burdened, none of the teachers interviewed for the pilot[4] reported regular use of comprehensive assessment systems (other than GOLD).[5] Several used PALS in addition to other measures, including the Developmental Reading Assessment (DRA), Reading Levels, and assessments that are provided with the local curricula. A few teachers reported using the Developmental Spelling Analysis (DSA) and keeping running records of children's spelling words. Teachers also reported diverse approaches to measuring mathematics skills. Most teachers interviewed during the pilot reported using no math assessment or else assessments developed at the school division, school, or on their own. These locally-developed assessments come in a variety of forms, such as teacher checklists and formal benchmark measures. A few teachers reported using the Measures of Academic Progress (MAPS) to assess children's progress in mathematics over the course of the year. A summary of assessments teachers **reported**

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[4] Teachers interviewed were from 9 of 14 participating school divisions and had a range of population characteristics. For example, in interview participants' schools, on average, 60 percent of Kindergarten children were economically disadvantaged, with a range from zero (0) to 86 percent.

[5] One teacher shared that they do some small scale assessment of fine and gross motor skills, but not to the extent that they can use the information to differentiate instruction. Specific information about existing assessments represents information provided by interview participants.

using is shown in Table 1, and one example of the extent of testing conducted locally during a Kindergarten year is shown in Table 2.

Table 1. Teacher-reported assessments used in pilot Kindergarten classrooms

Reading	Mathematics	Spelling
DRA	MAPS	DSA
MAPS	Division developed (includes checklists, benchmark measures)	Running records
PALS Quick Checks	School-developed	
Reading Levels	Teacher-developed	
Curriculum-based (e.g., McKenna Walpole)	Portfolio	
Division developed (includes checklists, benchmark measures)		

NOTE: These assessments were in place, and using GOLD became an additional requirement.

Table 2. Example of one school's Kindergarten assessment requirements

Measure	Fall	Winter	Spring
PALS K	X		X
Reading benchmark	X[1]	X[1]	X[1]
Measures of Academic Progress (MAPS), reading	X	X	X
Measures of Academic Progress (MAPS), reading	X	X	X

[1]Administered after every 2 instructional units.

Teachers reported that using other assessments had various influences on their use of and reported value of GOLD. In practice, having multiple assessments in addition to GOLD often meant that teachers were not using an observational process that is integral to using GOLD with fidelity. Rather, teachers used results of other assessments to inform GOLD checkpoints in the winter and spring. This required that data be entered into two places using different formats during the pilot, adding a task to teachers' already-full plates.

In terms of reported value, teachers who did not have formal assessments beyond PALS were more likely to find value in GOLD, and to appreciate what it had to offer. Most teachers who used other assessments reported that the reading and math information in GOLD was mostly redundant with other information.

Despite reporting some redundancy with existing measures, several teachers gave examples of useful information from GOLD that was not available from other sources, even when they had a long list of other assessments. For example, several teachers commented that GOLD's emphasis on writing skills was unique in their toolkit, and useful. More generally, when considering GOLD relative to their existing assessments, some

teachers appreciated the expectation in GOLD that children consistently demonstrate the knowledge, skills, and behaviors associated with a developmental level before moving on to the next. This helps to reduce situations where children succeed on a test on one day, but lose the concept the next. Several teachers emphasized with GOLD, they had more information available than they do with assessments that provide information about children's status (e.g., met the benchmark or not; average score), but do not offer information about where children are going next. GOLD includes information about where they needed to go next in each domain, which several teachers reported as being more useful than having assessment results as status information in isolation.

Local expectations demand whole or small group instruction nearly all day, with limited time for observation

Most teachers who participated in the interviews reported that it was difficult to find time in the day to conduct observations, which is required to use GOLD with fidelity. When probed as to why, teachers typically reported that their existing schedules required that they deliver direct instruction to students in whole or small groups throughout the day, and that it was difficult to both deliver instruction and take notes on specific GOLD objectives simultaneously. Due to the structure of their day, most teachers reported having limited if any time to directly observe children outside of the whole or small group environment.   The majority of teachers interviewed reported that children no longer used centers or had self-directed activities that would permit the types of observations GOLD demands. There were a few exceptions. For example, teachers from one pilot school reported that they had not used centers in Kindergarten classrooms for many years. However, during the pilot, the local administration approved the teachers' request to bring learning centers into their classrooms so that they could use GOLD as it was designed. Once they had centers, they were able to find some additional time for observations. There were also a few teachers who reported using observational methods in their classrooms for many years, although with less formal processes than GOLD requires.

Narrow curriculum and limited incentives to focus on learning objectives beyond reading and mathematics

Teachers reported that current Kindergarten classrooms focus almost exclusively on the academic subjects of reading and mathematics. Through open ended comments in the surveys and during interviews, teachers reported that their school leaders' lack of emphasis on learning and development in non-academic domains leads to a narrowed curriculum. The narrowed focus left teachers little to no time to observe children in social, emotional, and physical domains. The common teacher perspective was summed up by one teacher, who commented that "Cognitive and other skills aren't a priority--children need strong academics."

A common sentiment that teachers shared was that if a particular area of learning is not included in the local report card, there is no incentive, support for, or perceived need for instruction that fosters children's growth and development in those areas. Their reality is consistent with the common phrase, "what gets measured

gets done." They reported that the lack of information required for school report cards in social-emotional learning, physical development, and cognitive skills[6] results in limited attention to these domains in the classroom. Some teachers went so far as to suggest that they would like to see the GOLD outcomes <u>be</u> the report card items, in order to establish broad support for sustained focus on all areas of children's learning and development.

Despite reporting that it was challenging to use GOLD as it was designed to be used, several teachers shared that *if* they could structure their Kindergarten to use GOLD—to include both developmental and academic content—they believed children would be better served. Most teachers interviewed for the pilot preferred to create learning environments that focused on the whole child, including social-emotional and cognitive development, but the vast majority reported not having the support, incentive, or tools to deliver differentiated instruction on non-academic subjects.

I believe in looking at the whole child, but unfortunately, I was not able to use that information to change what or how I was teaching the children, which is very prescribed right now.

Teacher, VECF KRA Pilot, 2013/14

Reliability and validity in a one year pilot

The pilot evaluation served as a starting point for assessing Virginia's classroom teachers' ability to use GOLD consistently and accurately (i.e., reliably), so that the resulting data are an accurate reflection of children's developmental levels in each domain. The evaluation also provided a limited opportunity to assess GOLD's validity. Both of these are discussed in this section of the report.

Using GOLD reliably

There are multiple ways to assess reliability. Teaching Strategies has reported results of several studies of randomly selected, nationally representative samples of children for whom GOLD data were collected to demonstrate GOLD's internal consistency (Lambert, et al., 2013). There are a number of other methods to demonstrate reliability, such as test-retest reliability and inter-rater reliability. In this study, reliability was assessed using 3 approaches:

1) Requiring teachers to pass the GOLD-provided inter-rater reliability test during the pilot. This approach requires teachers to give children ratings that are similar to those of master teachers, and helps provide confidence that teachers understand GOLD's learning objectives.

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[6] Cognitive skills include concepts such as paying attention and engaging in the classroom, demonstrating persistence and problem solving skills, using symbols and images to represent what is not present, remembers and connects experiences, etc. See Appendix B.

2) Determining the distribution of GOLD ratings within classrooms relative to the distribution of ratings between classrooms, by calculating intra-class correlation coefficient (ICC). This statistic provides information as to whether children's ratings were more similar within classrooms than between classrooms, which could indicate bias.

3) Assessment of measurement invariance of GOLD ratings across three checkpoints, to determine whether GOLD scaled scores reflected the domains being measured similarly throughout the pilot year.

Given the challenges that teachers faced implementing GOLD with fidelity, it was not surprising that the results of the analysis suggest that teachers had difficulty using GOLD in a way that reflects consistent, unbiased use of the observational assessment throughout the year. In general, results of all three approaches to measuring reliability suggest that teachers' use of GOLD changed and improved over the course of the year.

Inter-rater reliability test results

In the fall, on average across domains, 69 percent of teachers passed the inter-rater reliability (IRR) assessment on the first attempt, although the percentage varied from 41 percent in the social-emotional domain to 85 percent in language. In the spring, the vast majority of teachers (> 96 percent) passed IRR on the first attempt in all areas except for cognitive. In the spring, approximately 70 percent passed the cognitive IRR test on the first attempt, suggesting a potential area to work on for the remaining 30 percent of teachers. Other states have also shown that more teachers are challenged by GOLD's cognitive domain than other GOLD learning and developmental areas (Soderberg, Stull, Cummings, Nolen, McCutchen & Joseph, 2013).

Intra-class correlation coefficient

The intra-class correlation coefficient (ICC) helps to determine the between-classroom variance in children's GOLD scores. ICC ranges from 0.0 to 1.0. An ICC of 0.0 indicates that children's scores were randomly distributed throughout classrooms in the pilot and an ICC of 1.0 indicates classroom bias. In practice an ICC of 0.0 is not attainable, because children are not in fact randomly assigned to school divisions or classrooms, and several influences, such as children's preschool learning environments, teachers' ability to use GOLD with fidelity, and clustering of students with learning disabilities or those who have limited English language skills will lead to systematic differences in children's GOLD scores. For example, in the pilot sample of children, the ICC from fall PALS assessment was 0.10, which reflects more than a decade of assessment use, honed training, experienced leaders supporting teachers, and a different, one-on-one task-based assessment method. While in general, lower ICC are considered better when considering assessments of individual children, there are no commonly accepted guidelines to determine whether a particular ICC is too high.

In this pilot, the ICC was highest in the fall, when external factors are most likely to influence scores *and* when teachers were new to using the tool, both of which could increase ICC. The average ICC in the fall was 0.49, but ranged from 0.30 (social-emotional domain) to 0.67 (physical domain). The ICC was lower in the winter, averaging 0.38, and ranging from 0.29 in language and literacy, to 0.46 in the cognitive domain, with similar results in the spring. This suggests that over the course of the year, external and classroom factors had less of influence on GOLD scores than was evident in the fall. However, providing teachers with greater support for

implementation would reduce the challenges described earlier in this report, and reduce the unique influences that classroom placement has on GOLD scores.

Measurement invariance

The evaluation team used a statistical approach called factorial invariance to determine whether scaled scores on each of the GOLD domains reflected the same construct at each checkpoint over the course of the year, or whether it appeared that teachers' understanding of the domain changed over time. Consistent with results from the IRR and ICC methods, results suggested that teachers' use of the GOLD scales changed at each time point. It is quite possible that these differences are related to the learning curve associated with teachers' increasing experience with GOLD over time. While not possible in this evaluation, it would be helpful to assess measurement invariance for groups of teachers with more experience using GOLD, to determine how long and what type of training and support is required to show consistent use of the scales over time.

Validity

Given the results of the reliability assessment, the evaluation of GOLD's validity is limited to teacher reports of the appropriateness of GOLD for use in Virginia's classrooms. Teachers were asked to consider GOLD's appropriate use given the range of students' abilities, and linguistic, ethnic, and cultural diversity. The majority of teachers (75 to 80 percent across the year) reported that GOLD was appropriate for their students, and a larger percentage of teachers reported that GOLD was appropriate for use with students with disabilities and English learners. Through the surveys and interviews, the most common concern reported was GOLD's limited ability to assess children who met or exceeded Kindergarten learning levels before the end of the year. The number of children who were performing above grade level varied by classroom, but such children were enrolled in nearly all classrooms in the pilot. During the Smart Beginnings KRA pilot year, Teaching Strategies was in the process of finalizing a version of GOLD that includes learning objectives for children up through grade 3. This addition would significantly reduce the challenges teachers faced using GOLD for children who were performing above grade level.

Summary

The Smart Beginnings KRA Pilot was aimed at determining the feasibility of implementing a multi-dimensional, observation-based assessment tool in Virginia's Kindergarten classrooms to inform early childhood improvement efforts and to inform and guide teaching and learning in Kindergarten classrooms. The pilot results suggest that GOLD aligns with the majority of teachers' assessment philosophies and that Kindergarten teachers are interested in using these types of assessments. The following summarizes feasibility results from GOLD, and provides recommendations for choosing Kindergarten assessments in the future.

Include assessments in multiple areas of learning and development that research indicates are important for children's long-term success in school and life.
In the pilot, the most commonly reported value of using GOLD was the ongoing emphasis on multiple

domains of learning and development. While teachers struggled with this feature of GOLD, reporting that they had few incentives to focus the learning environment on content other than English/language arts and math, they also reported that they believe that focusing on the whole child is more beneficial to children than the current, narrowly-focused curriculum. These reports are consistent with national research suggesting that the curriculum has narrowed and now looks more like first grade relative to the past (Bassok & Rorem, 2014), and associated concerns with this narrow curriculum (e.g., Miller & Almon, 2009). Teachers' interest in focusing on the whole child is also consistent with suggestions that Kindergarten can and should focus on academic *and* developmental learning objectives, not one or the other.

Teachers value having information about the continuum of learning expectations.

Teachers commonly reported that having access to clearly-articulated learning expectations across the developmental continuum made the GOLD results more valuable than assessment results they currently receive, which are often isolated from the learning continuum and leave teachers unclear about the next critical step in each child's learning path. These results suggest that assessments that result in scores in the context of a clearly articulated learning continuum or pathway, and that provide teachers with instructional resources that can be linked to children's scores would be more beneficial to teachers than status-only assessments.

Assessments should include learning objectives and measures above grade level.

In addition to providing a continuum of learning objectives in multiple domains, this pilot made it clear that teachers and administrators need access to learning objectives and assessments that extend beyond grade-level, in vertical alignment with grades above and below children's actual grade. During the pilot, many students met Kindergarten exit expectations by the middle of the school year. Through the survey and interviews, teachers reported that GOLD's limited range impacted the tools' utility—some reported that that having learning objectives and measures of progress for their higher performing children would be beneficial. The new version of GOLD that includes learning objectives through grade 3 should meet teachers' needs. Administrators further expressed a preference for measurement tools that were vertically aligned with pre-school or first grade measures.

Implementing developmentally appropriate, observation-based assessment will require a different learning environment than is present in most Virginia's Kindergarten classrooms.

Through surveys and interviews, it became clear that the majority of Virginia Kindergarten classrooms in this pilot were not set up to support the use of multi-dimensional, developmentally-appropriate, observation-based assessments. They are focused primarily on English/language arts and mathematics in a setting that encourages or requires teachers to deliver direct instruction nearly all day. Many teachers reported that in their current classrooms, they do not have time or incentives to focus on other learning and developmental domains that are predictive of future school success, including social-emotional skills.   As well, teachers reported having little to no time to observe children demonstrating their skills in practical, hands-on activities. When moving to new assessment methods, it is critical that teachers have aligned curricula and the time and support to ensure that daily lesson plans and the learning environment more generally address all assessed

domains. Teachers and administrators in this pilot suggested that for long-term success in using observation-based measures, teachers could benefit from introducing this approach more slowly. For example, teachers could assess a limited number of children in all domains during the first year, and add children in subsequent years. Another suggestion was to ask teachers to assess all children in one or two domains in the first year, and add domains in subsequent years, once teachers have more experience with the approach more generally.

A strategic assessment strategy is important to avoid layering new assessments on top of existing assessments.

When considering adding new assessments in Kindergarten, it is critical that these be embedded in an intentionally-developed strategic plan for assessment use. Teachers reported using a wide range of assessments in pilot classrooms, from PALS-only to ongoing use of summative and benchmark assessments, with limited if any formative measures. Simply adding more assessments to Kindergarten classrooms without removing existing measures is burdensome to both teachers and students, taking time away from other instructional activities that are critical for teaching and learning. This applies to teachers' use of observational-based and other forms of assessment. When developing assessment strategies, it will be important for highly-experienced master teachers to have input, to ensure that the assessment approach provides classroom teachers and administrators with data and resources to inform teaching and learning.

Consistent, reliable use of observation-based measures will require additional training and ongoing support.

Teachers' responses to surveys and information provided during interviews suggested that the two-day Teaching Strategies-provided training on the use of GOLD was necessary but not sufficient to enable teachers to use GOLD reliably and with fidelity throughout the school year. The pilot results suggest that reliability improved over the course of the year. However, results also point to a need for pre-service and in-service skill-building for teachers to successfully use observation-based assessment. While this pilot did not test different implementation methods directly, it offers important insights into the types of supports teachers need to improve their ability to reliably use GOLD or similar measures. These are:

- Ensure that administrators provide support and perhaps incentives for teachers to focus on multiple dimensions of learning and development, including language and literacy, mathematics, social-emotional development, cognitive, and physical development. Several teachers suggested that including the GOLD domains on the report card would ensure that lesson plans included these areas of learning and development.
- Establish collaborative planning time with other teachers, administrators, and content/area experts to ensure lesson plans are developmentally-appropriate, align with content and developmental learning areas, and enable children to demonstrate the skills being measured through observation. Most teachers suggested that having planning time before implementation and after each checkpoint would be most helpful to improving their successful use of this type of assessment.

- Support the role of an implementation coordinator, to enable teachers and administrators ability to learn from each other's experiences, share best practices, and more generally, to field questions that arise throughout the school year.
- Create a classroom structure that gives teachers time to observe children and reflect on their needs. Pilot teachers reported that their day is filled with direct whole- and small-group instruction, with limited if any time to observe children in authentic settings. Teachers could use additional support and model lessons that provide time for children to learn and demonstrate skills along the continuum, and for teachers to observe and document learning successes and challenges.
- Provide teachers with on-site coaching to help them better integrate observational methods and data collection into their daily teaching activities.

Recommendations

Supporting children's preparation for and success in Kindergarten—particularly for at-risk children—is an important strategy for reducing the readiness gap that exists in Kindergarten, and for improving young children's school and life success. This is particularly important in communities serving large numbers or proportions of children at-risk of not being school ready upon Kindergarten enrollment and more generally, who are at-risk of not reaching their fullest potential in school and life. Key factors in these children's long-term success is effective early intervention, and the presence of highly-competent teachers who have the tools and supports needed to create effective learning environments. Such environments meet children where they are, and move children along a clearly defined learning path that ensures that all children meet or exceed expectations.

Moving forward, it is recommended that Virginia take steps toward creating a continuum of early learning and support structures that facilitate teaching excellence, accelerated learning, and children's successful development in Virginia's communities and school divisions. With funding challenges at the state and local levels, a productive first step could be a cohesive focus on creating this continuum in communities with chronically underperforming elementary schools. A pilot designed for these communities should include aligned and coordinated curriculum, lesson planning, comprehensive assessment practice, and professional development and learning communities in classrooms from pre-K to third grade. Piloting a seamless process in targeted communities and reaching the highest-need students could leverage federal funding opportunities, reducing strain on the state's financial commitment during budget shortfall, as well as inform the ongoing review and reform of Virginia's assessment system.

Supporting teachers in Virginia's lowest-performing schools to deliver rich, high quality, developmentally-appropriate instruction with complementary assessments to measure progress should be a priority in Virginia's reform efforts.

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Appendix A: Participating schools and divisions

Virginia School Division	School name
Augusta County Public Schools	Craigsville Elementary
	Guy K. Stump Elementary
	Verona Elementary
Buena Vista County Public Schools	F.W. Kling Elementary
Chesterfield County Public Schools	Bensley Elementary
	Marguerite Christian Elementary
	Woolridge Elementary
Danville Public Schools	G.L.H. Johnson Elementary
	Park Avenue School
Hampton City Schools	Phenix Elementary
Harrisonburg City Schools	Spotswood Elementary
	Stone Spring Elementary
Henrico County Public Schools	Mehfoud Elementary
	Twin Hickory Elementary
Hopewell City Schools	Dupont Elementary
	Harry E. James Elementary
	Patrick Copeland Elementary
Norfolk City Schools	Lindenwood Elementary
	Tidewater Park Elementary
Northampton County Public Schools	Kiptopeke Elementary
	Occohannock Elementary
Petersburg City Schools	A.P. Hill Elementary
Richmond City Public Schools	John B. Cary Elementary
	J.B. Fisher Elementary
	Ginter Park Elementary
	Mary Munford Elementary
	William Fox Elementary
	Southampton Elementary
Tazewell County Public Schools	Richlands Elementary
	Tazewell Elementary
Williamsburg/James City County Schools	Clara Byrd Baker Elementary
	J.B. Blayton Elementary

Appendix B: Summary of areas and learning objectives included in the Virginia KRA pilot

Social–Emotional

1. Regulates own emotions and behaviors
   a. Manages feelings
   b. Follows limits and expectations
   c. Takes care of own needs appropriately

2. Establishes and sustains positive relationships
   a. Forms relationships with adults
   b. Responds to emotional cues
   c. Interacts with peers

3. Participates cooperatively and constructively in group situations
   a. Balances needs and rights of self and others
   b. Solves social problems

Physical

4. Demonstrates traveling skills
5. Demonstrates balancing skills
6. Demonstrates gross-motor manipulative skills
7. Demonstrates fine-motor strength and coordination
   a. Uses fingers and hands
   b. Uses writing and drawing tools

Language

8. Listens to and understands increasingly complex language
   a. Comprehends language
   b. Follows directions
9. Uses language to express thoughts and needs
   a. Uses an expanding expressive vocabulary
   b. Speaks clearly
   c. Uses conventional grammar
   d. Tells about another time or place
10. Uses appropriate conversational and other communication skills
    a. Engages in conversations
    b. Uses social rules of language

Cognitive

11. Demonstrates positive approaches to learning
    a. Attends and engages
    b. Persists
    c. Solves problems

  d. Shows curiosity and motivation

  e. Shows flexibility and inventiveness in thinking

12. Remembers and connects experiences

  a. Recognizes and recalls

  b. Makes connections

13. Uses classification skills

14. Uses symbols and images to represent something not present

  a. Thinks symbolically

  b. Engages in sociodramatic play

Literacy

15. Demonstrates phonological awareness

  a. Notices and discriminates rhyme

  b. Notices and discriminates alliteration

  c. Notices and discriminates smaller and smaller units of sound

16. Demonstrates knowledge of the alphabet

  a. Identifies and names letters

  b. Uses letter–sound knowledge

17. Demonstrates knowledge of print and its uses

  a. Uses and appreciates books

  b. Uses print concepts

18. Comprehends and responds to books and other texts

  a. Interacts during read-alouds and book conversations

  b. Uses emergent reading skills

  c. Retells stories

19. Demonstrates emergent writing skills

  a. Writes name

  b. Writes to convey meaning

Mathematics

20. Uses number concepts and operations

  a. Counts

  b. Quantifies

  c. Connects numerals with their quantities

21. Explores and describes spatial relationships and shapes

  a. Understands spatial relationships

  b. Understands shapes

22. Compares and measures

23. Demonstrates knowledge of pattern

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