



EARLY MATH – WASHINGTON’S PROFESSIONAL DEVELOPMENT LANDSCAPE (2019)



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Washington State Department of
CHILDREN, YOUTH & FAMILIES

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Acknowledgments

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We would particularly like to thank:

- Child Care Aware Early Achievers Coaching Supervisors
- Child Care Aware Professional Development Coordinators
- Early Learning Fellows
- Educational Service District Coordinators
- ECEAP Early numeracy training participants
- University of Washington Cultivate Learning
- University of Washington Inspire
- Washington Early Childhood Teacher Preparation Council
- The Early Math Coalition partners and Steering Committee
- The trainers and coaches who were interviewed
- The many providers who participated in focus groups

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Purpose

Bold Goals

The Department of Children, Youth, and Families (DCYF) and its early learning partners are focused on early learning efforts toward children’s success. One of DCYF’s goals is to prepare children for kindergarten and that race and income are no longer predictors of readiness or success.

In 2018, 47.4% of Washington’s children entered kindergarten ready (as captured in the state’s *Washington Kindergarten Inventory of Developing Skills*, or WaKIDS.) And children in lower-income families – and many children of color – were ready at lower rates than those from higher-income families. When looking at math skills expected at kindergarten entry, only 66% of children statewide are prepared.

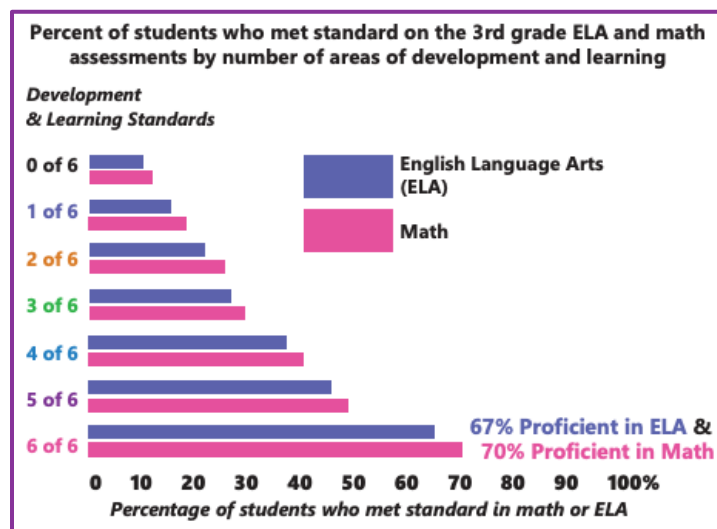
- 33.0% of migrant children arrive with expected skills.
- 50.2% of children living in poverty arrive with expected skills.
- 47.0% of Hispanic/Latin children arrive with expected skills (compared with 72.7% of white children and 80.9% of Asian-American children).¹

Research shows that “although virtually all young children have the capability to learn and become competent in mathematics, for most the potential to learn mathematics in the early years of school is not currently realized ... This is particularly the case for economically disadvantaged children...”² This points out that Washington must do more to prevent the opportunity gap that contributes to inequities in achievement.

Driven by this, DCYF and state partners are taking action to support children’s early confidence and success in math.

School Readiness Links to Third Grade

Washington sees promising links from early learning to later school success. Children whose readiness was the first to be assessed using WaKIDS have now entered third grade. Their achievement (as measured by the *Smarter Balanced Assessment*, or SBA) provides evidence of the long-term effect of being ready. As noted in the graph above, 70% of children prepared in all six areas of development and learning before kindergarten were later proficient in math in third grade, while only 30% of those prepared in three areas were.



Partners Are Committed to Increasing Change

DCYF and other state partners³ have launched a cross-sector Early Math Coalition (EMC), engaging partners from more than 70 local, state, and regional organizations across Washington to determine how Washington can enhance math development for children and increase the professional skills of educators. EMC developed a *Theory of Change* (see Appendix B) that recognizes great work happening by expanding availability and builds in new supports to promote math success.

¹ Thrive Washington. (December 2018). *Early Math System and Resource Analysis*.

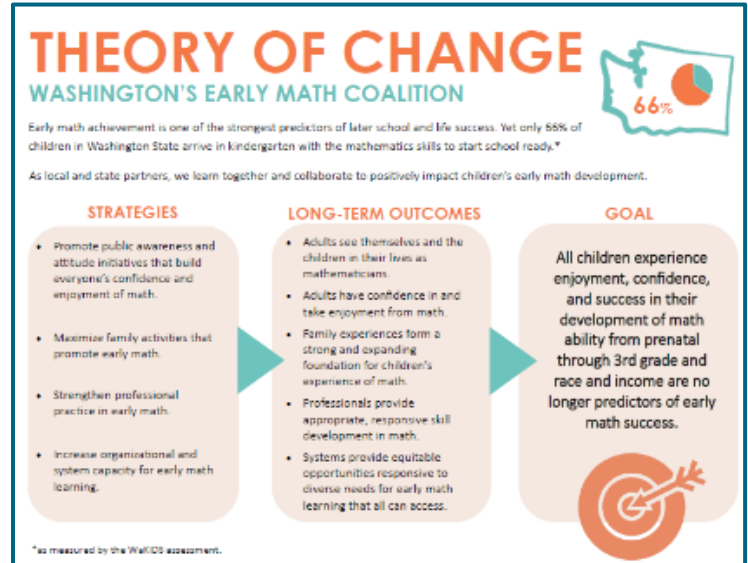
² National Research Council. (2009). *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity*.

³ Key partners include Office of Superintendent of Public Instruction, Washington STEM, Child Care Aware of Washington, Association of Educational Service Districts, State Early Learning Regional Coalitions, and University of Washington Inspire and Cultivate Learning Centers.

Research and experience show unique challenges promoting math due to the negative experiences of many adults. EMC’s goal is to positively impact all children’s early math development, so they experience enjoyment, confidence, and success – and that race and income are no longer predictors of early math success.

The coalition’s core strategies are:

1. **Raise Awareness** – Promote initiatives that build everyone’s confidence and enjoyment of math.
2. **Engage Families** – Maximize family activities that promote early math.
3. **Support Professionals** – Strengthen professional practice in early math.
4. **Strengthening Systems** – Increase organizational and system capacity.



Professional Development Research Approach

Research Purpose

DCYF identified a priority to advance work around professional development related to early math. Our state knows a lot about the early childhood educator, coach, and trainer workforce through our workforce registry, as described below. In addition to what is already known from workforce data analysis, analysis specific to early math professional development and practice will allow us to better understand how to impact professional practice in early math skill development. This effort focused on:

- Building on existing data to analyze the professional learning landscape.
- Identifying options to strengthen high-quality math content and professional development.

This will be used to provide recommendations for professional learning options that can be used to select strategies and further explore promising practices.

Methodology

To create this landscape analysis, DCYF:

- Reviewed internal data analyses based on MERIT and other data.
- Reviewed STEM training data.
- Reviewed Thrive asset mapping and WaKIDS analyses.
- Conducted interviews with nine early learning professional development system leaders.
- Held focus groups with 63 educators, coaches/trainers, and professional development leaders.

Data Analysis

There Are Many Different Types of Organizations to Support

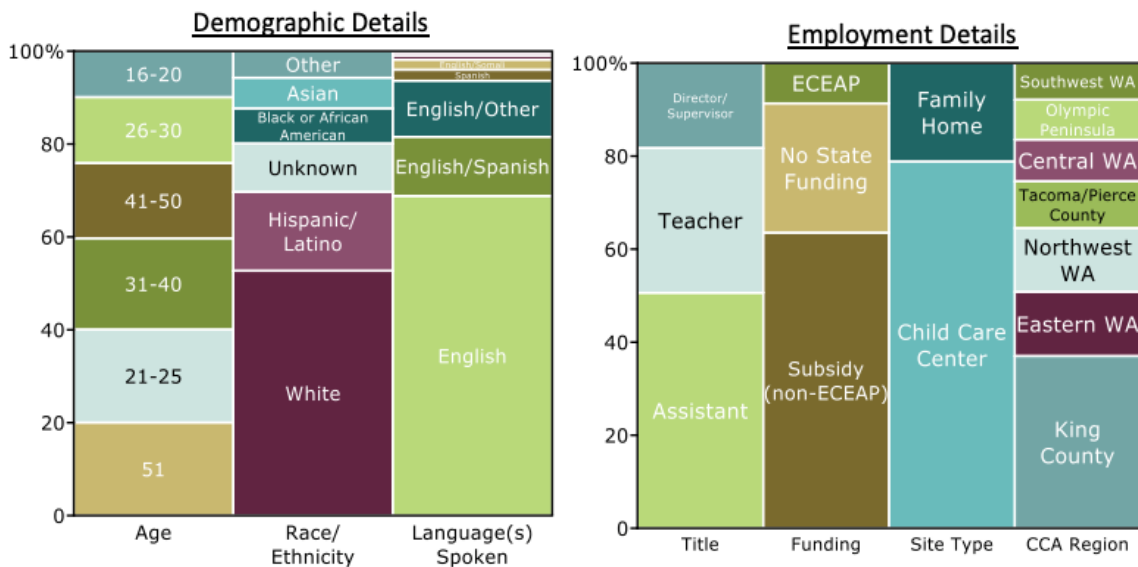
The December 1, 2018, Joint Select Committee on the EA Program Report to the Legislature notes that Washington’s early learning system is comprised of:

	Overall Sites	Overall Children Served	Early Achievers Sites	Early Achievers Children Served
Licensed Child Care Centers	1,651	46,286	1,236	25,120
Licensed Family Home Child Care	2,399	18,845	2,350	9,644
ECEAP	368	12,491	368	12,491
Head Start	361	13,599	262	
Family, Friends, and Neighbors	9,295 subsidized providers	14,625	NA	NA

Note: Some children may be enrolled in more than one program.

The Workforce Has Varying Demographics

An internal DCYF analysis of MERIT data shows an active early childhood educator workforce in Washington of 37,341 as of 08/15/17.⁴ The reported and known workforce demographics are noted below, with the majorities of the workforce being assistant teachers, educators working in situations accepting Working Connections Child Care subsidies, working in center-based care, being white, and speaking only English.



⁴ 3SI. (04-04-18). *Early Learning Workforce Education and Certificate Gap Analysis Update*.

There Are Many Partners in Professional Development

Early learning educators receive professional development and professional learning support from various sources tied to their individual educational goals and progress and their organizational goals and progress.

The Thrive Washington *Early Math System and Resource Analysis* notes 182 local individuals serving educators for math professional development. Many of these are associated with key agency partners in this work:

- Instructors at colleges and universities that provide formal education and credentials.
- Early Achievers coaches that help educators and their organizations progress to higher levels of quality.
- State, regional, and local agencies (ESD coordinators, Early Learning Fellows, others) and private trainers (conference trainers, state-approved trainers, private coaches) that provide specialized math instruction.
- Agencies (ECEAP preschool specialists) and non-profit partners (Imagine Institute, University of Washington Inspire and Cultivate Learning) that develop, pilot, and expand innovative practices.

Current Math-Related Training Needs to be Expanded

DCYF extracted STEM-related training listings out of the approximately 10,000 training instances between 2016-18. The result was 14% of training, or 1,440 instances, were related to STEM. Of these:

- Only 15.3% included math content.
- Three organizations (all ESDs: 112, 113, 123) provided 10 or more math-related training sessions during the nearly 2¾-year sample period.
- Five trainers taught more than five math-related courses.
- 8% of trainers offering STEM content taught 21.7% of math-related courses.
- 93% of current math content is provided in a classroom setting.
- Most math content has no training “level” (1-5) indicated. When this was provided, most often, a ‘range’ of levels was provided, and 57% addressed higher level (4-5) content.

15.3% of STEM training is math-related

8% of STEM trainers taught **21.7%** of math-related course

93% of current math content is provided in a classroom setting

Trainers May Not Always Reflect Educator Workforce

Data from 2016 show the trainer workforce is nearly 80% white, while the educator workforce is less than 60% white. More than 80% of trainers speak English, while just over 70% of educators speak English, many as a second language.⁵ A key solution training partners seek is ensuring there are interpreters. While efforts continue to improve, DCYF continues to increase the recruitment of culturally and linguistically diverse trainers.

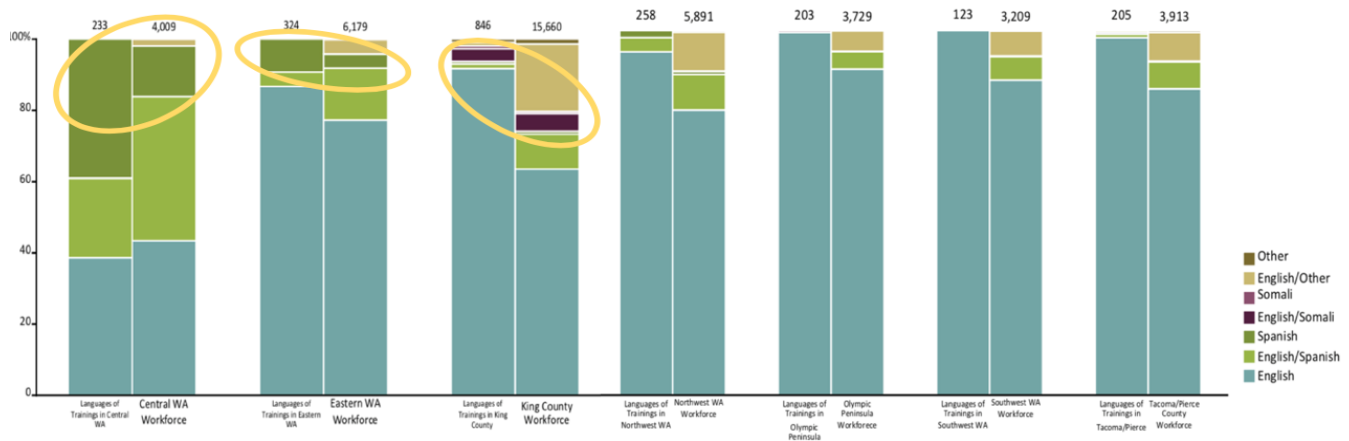
Educator Impact: Many educators speak English as a second language but may still miss important details and depth when not trained in their home language. Many who speak English may not have the technical vocabulary required to understand complex topics such as scaffolding or learning trajectories. Focus group participants suggested several ideas to address this while DCYF continues recruiting and preparing a more diverse training workforce. These ideas will be featured in a companion document (*Early Math Professional Learning Options*) and explored further.

Some Regions Are Providing Training in Home Languages

In the central region, more than 60% of training sessions are in Spanish or Spanish and English, while nearly 55% of the workforce speaks Spanish or Spanish and English. In Eastern Washington, Spanish language training is prevalent for the Spanish-speaking workforce, and in King County, the same is true for Somali language training.

⁵ Early learning mirrors K-12, which has 11.1% teachers of color, yet 45.6% students of color (Seattle Times. *Teacher Diversity in Washington State*) 12/18/18

Languages of Training & Language Spoken by Workforce (in FY 2016 by Region)



Source: MERIT datasets, 7/01/15-06/30/16, monthly extracts; HS, FFN excluded

Communities Have Different Local Sources of Support

The *Thrive Washington Early Math System and Resource Analysis* catalogs three types of efforts across our state identified by early learning coalitions and other Washington Early Math Coalition partners:

- Resources** such as Ready! For Math kits and OSPI’s *Learning Pathways in Numeracy* – 39% (45 of 115) of which were specified for early childhood educators.
- Activities/Events** such as Early Math Professional Learning Modules or Kaleidoscope Play & Learn) – 38% (134/351) of which were professional development opportunities.
- Support Professionals** such as Early Learning Fellows and UW Inspire – 32% (85/268) of which were focused on professional development.

The large variety of efforts form a foundation that DCYF, the Early Math Coalition, and its partners can use to focus expanded support to professionals and families to help children be confident and successful mathematicians.

Findings From Focus Groups and Interviews

DCYF engaged 63 early learning educators in six focus groups and interviewed nine early learning professional development leaders to understand important gaps in content and professional learning support, barriers that educators experience, and ideas for the best ways to build educator confidence and skill as they help children be confident and successful mathematicians. The sample of perspectives was not fully representative, but the 72 individuals engaged were 25% Latin, 6% Black, 1.4% Asian American, 68% white, and 93% women.

Research Areas

- Content Delivery** – Understanding current math content and identifying and prioritizing gaps.
- Method and Implementation** – Understanding methods that engage providers and ease implementation and needed professional development capacities.
- Coach and Trainer Preparation** – Understanding and prioritizing math instruction competencies and tools that help.
- Systems** – Understanding and identifying educators’ barriers to access and success in math instruction.

High-Level Findings

Findings span 12 areas and are sorted below into the four strategy areas advanced by EMC. In many instances, the findings validated *Overarching Themes, Key Concepts, and Recommendations* provided in the *Thrive Washington Early Math System & Resource Analysis* (pages 24-26, 31-32).

Awareness and Confidence

1. Use of Language About Math Needs to Be Clear
2. Child Expectations Needs to Be Developmentally Appropriate

Family Engagement

3. The Needs of Families and Educators Overlap

Professional Preparation and Support

4. Educators and Coaches Need a Strong Foundation
5. Educators Want Advanced Training and Education
6. Educators Need Connection and Supports
7. Access to High-Quality Content is Needed
8. Educators Learn Best When Professional Development is Relevant

Systems

9. Educators Have Many Competing Priorities
10. There Are Useful Ideas About How to Increase Support
11. There Are Barriers to Accessing Training
12. There Are Many Ways to Incentivize Math Professional Development
13. Systems Need to Support Access and Consistency

Detailed Findings

Use of Language About Math Needs to Be Clear

Educators and professional development leaders noted that the way we talk about math in early learning settings and society can be confusing and inconsistent. They also say that language used in math courses is often unfamiliar or beyond their basic knowledge and skill in math.

- a. In higher education courses, policy discourse, and training, we often move between “numeracy” and “early math,” sometimes using the terms interchangeably – though their meaning differs. This creates confusion about the focus and scope of our goals.
- b. Educators and trainers noted that when they learn more about math, they realize that they and other educators are doing a lot of math, but because the overall understanding of math is low, many don’t know and label it. Others note that when many educators and coaches/trainers think about math, the focus is mostly on counting.
- c. Educators say that vocabulary and materials in introductory math training are often complex, and they feel it is math knowledge they do not have.
- d. Almost all educators and trainers said they had negative experiences in math, even in some instances being labeled as not capable. Math fear and anxiety can get in the way. Most say they do not see themselves as “mathematicians.”

Child Expectations Need to Be Developmentally Appropriate

A small but vocal portion of the educators and trainers/coaches interviewed raised concerns that the high expectations for all children to achieve in math may not be developmentally appropriate and can contribute to bad experiences and poor outcomes for children.



- a. Some wonder if the level and pacing/timing of math achievement are developmentally appropriate in these early years. Some think that math is “taught later” and don’t see their role in early mathematical thinking and teaching math concepts.
- b. Many educators and coaches/trainers wondered whether achievement gaps in WaKIDS math and SBA scores capture all of the development and learning that is happening. These educators and trainers particularly questioned whether the assessment tools and milestones are reflective of all cultural norms.
- c. Most educators and coaches/trainers see the value of having individual information about how children are doing and how their skills are changing. Most would appreciate more training in this area. Regardless, almost all have concerns that the system does not adequately protect against labeling and tracking children early.

The Needs of Families and Educators Overlap

While the early learning professional development system is designed to support professionals with a career in early learning, there were areas where educators and coaches/trainers see overlap in what educators and families need to help children succeed in math.

- a. For those educators with children at home, seeking math training is difficult. They wonder if combined parenting education and educator training might be helpful.
- b. Educators say that families appreciate math activities and tools and crave more from them. Educators want to align what they do and what families do to help children progress. They would appreciate having more activities and tools that work at home and in early learning settings – and having enough materials and tools to share.



Educators and Coaches Need a Strong Foundation

Both educators and trainers/coaches said that most educators in early learning lack a strong enough foundation to build strong math instructional skills through training in instruction alone. All felt that the foundation needs to be strong to be successful.

- a. Many said that they lack computer technical skills (and reliable high-speed internet) for online learning.
- b. Many commented that educators and trainers lack a strong foundation in developmentally appropriate practice to know what is expected at what age.
- c. Most said they see professionals use worksheets and checklists because they do not know how to generate activities and explorations to respond to child interests.
- d. Most educators said they did not have enough understanding of how to scaffold children’s learning to build from something they know to continued success.
- e. Many educators and coaches/trainers said their understanding and skill in basic math is not strong enough to support children’s learning.

“Math looks very different in classrooms today than it did when most caregivers and teachers were students. Worksheets and timed math facts are being replaced with active, hands-on problem-solving and children talking about their mathematical reasoning.”

- Thrive Washington Early Math System and Resource Analysis

Educators Want Advanced Training and Education

In most focus groups, educators named additional training in math as something that would help them support children as confident and successful mathematicians – even before they were asked specifically about training as an option. Educators are eager for stronger skills. Some specific content areas were named.

- a. Doug Clements’ *Learning Trajectories* were named as powerful tools for helping educators scaffolding children’s learning.
- b. Educators thought the *Learning Pathways in Numeracy* tools could be useful to more educators.
- c. Some educators exhibited strong knowledge in how to support integrated math, literacy, and socio-emotional learning, while others said they would like to be able to do this “organically” with kids.



- d. Most educators said that they would like to know how to use assessment data about individual children and classrooms (like Gold® and WaKIDS) to structure activities.
- e. Professional development leaders noted that many educators, trainers, and coaches seem to struggle with moving between theory, data analysis, and practice.

Educators Need Connection and Supports

Many educators said they wanted tools like developmental milestones in math and activities to encourage learning but don’t get them from their organization. Others say that their organization does not routinely provide needed or required training, and they only learn if they happen to meet a peer mentor who can help.

- a. Educators said the turnover in their organization means they are often managing short-staffed, and people may be in roles without needed preparation.
- b. The Thrive needs assessment showed that even in long-standing coalitions, there are missing connections among educator and trainer/coach networks.
- c. Educators say that even when training is provided in their home language or when they feel like their foundation is developing, learning with peers can deepen their understanding even more.



Access to High-Quality Content is Needed

High-quality content is deemed to be supportive of child development and learning generally, and math specifically is not always readily available to educators.

- a. In several focus groups, a majority of educators asked for tools (such as the *Washington Early Learning and Development Guidelines*) that should be readily available, but they had either never heard of them or “only the director” had a copy.
- b. Little math content is provided at most conferences, so there are few options for educators. Some trainers and coaches say they have offered content and had no registrants.
- c. Educators appreciate the math modules, but some feel that the approach and tools are “too K3-focused” and teacher-directed.
- d. Most educators do not have *Creative Curriculum version 6* or later, which addresses math development and learning.
- e. Many educators get their ideas for math activities, games, and tools from Pinterest or other online sources but have no way to tell if it is high-quality.
- f. Most educators had not heard of promising tools such as Zeno Math, Tiny Polka Dots, or STEAM Trunk.



Educators Learn Best When Professional Development is Relevant

Educators said that often what math courses are available are too conceptual and not related to daily work. They said what they need to help children with math is not usually available.

- a. Educators said that if they do not have a BA or if they have challenges with math, then expectations for success are not as high as they should be given what they can do.
- b. Having content explained, demonstrated, and discussed among peers really helps.
- c. Educators who speak languages other than English say that they can overcome the limitations of English instruction if they can discuss content with peers in their home language through in-class discussion groups or shortly thereafter.
- d. Monolingual Spanish educators noted that it helps to have instructors who reflect their culture and language and those of children because it makes it easier to generate ideas about activities that build on child interest (e.g., use of musical instruments for math learning that is common among those in the focus group).



- e. Because children learn best when all adults in their lives are supporting their development and learning, all educators asked for more support with math activities that align their efforts and those of families.

Educators Have Many Competing Priorities

The need to meet regulatory, quality, and administrative requirements was on the minds of educators, trainers, and coaches. All noted this is in addition to the need to attend to family needs, maintain a viable business, and respond to the varying needs of children – making a stronger focus on math farther down the list.

- a. Achieving a quality level of excellence in Early Achievers (and therefore higher subsidy) and the need to understand and meet WAC requirements (and implement the new attendance system) are central focuses.
- b. Because of training costs and the need for substitutes, most educators consider off-site training challenging to attend or not an option.
- c. Children are entering programs with many and diverse learning and behavioral needs, which take teacher’s time away from implementing new activities and feeling ready to create math activities that respond to child interests. Many feel they are spending most of their time responding to behavior challenges.
- d. Many educators have children and family responsibilities as well as business responsibilities that take up available time. Educators, in particular family home providers, express exhaustion at the number of competing demands.

There Are Useful Ideas About How to Increase Support

Educators had many ideas about how to increase support for math.

- a. While educators with internet and computer skills like the flexibility of online and self-guided content, they are reluctant to learn math instruction this way – unless there are online or in-person peer learning cohort discussions to enhance online content.
- b. Having access to developmentally appropriate activities and materials increases their comfort and frequency of math as a focus.
- c. Having additional support in the classroom – such as behavioral health or other specialists – can help address children’s non-math concerns to have enough time to focus on math. Having additional access to job-embedded professional learning with on-site math specialists can help them implement math instruction more fully.
- d. Integrating math activities with existing literacy and socio-emotional learning efforts supports whole-child learning and eases implementation when it aligns with work educators are already doing.
- e. While most educators expressed initial reluctance to see their interactions with children on video, nearly all involved in the study thought FIND-like video recording, with reflective supervision, would be very helpful in building their strength in emergent math activities.



There Are Barriers to Accessing Training

Educators named many things that keep them from seeking more training in topics like math instruction. Some are larger structural challenges, others relate to organizational capacities and decisions, and others are related to the math course offerings available.

- a. Many educators said high-speed internet is not available or unreliable in their communities. Many also said that online training platforms require an understanding of computer skills they do not have.
- b. Educators whose primary language is not English said most available math-specific training is only provided in English.
- c. Most training costs money that educators cannot spare, and math instruction is seen as “extra” or “desirable” “additional” content.
- d. Some educators in larger organizations said that many training courses (like those in math topics) are reserved for the director or someone else in the organization.
- e. Some educators and professional development leaders say efforts to purchase materials or implement math and other activities are not supported by their administration.

“In many cases, the administration has selected a curriculum that does not prioritize activity areas, so teachers’ efforts to get materials and activities to promote math are rebuffed as unnecessary. This is especially true in school district sites.”

- Focus group of professional development leaders

There Are Many Ways to Incentivize Math Professional Development

All those participating in the study named many monetary and non-monetary incentives that might spur more involvement in math training.

- a. Educators prioritize attending training that is no-cost and substitutes are provided.
- b. Scholarships and grants can help for formal education but do not address the issue of compensation during participation that is common in K-12. On-site and job-embedded training can help with this. Incentives for organizations to have in-service math training days might make sure that it happens consistently.
- c. Increased opportunities to join pilots and labs that offer intensive supports are interesting to those wanting to do more.
- d. Educators prioritize training that provides materials (games, tools, instruments, etc.).
- e. An “area of specialization” might engage more educators to focus on math.



Systems Need to Support Access and Consistency

Some overarching systems are also not fully in place or developed.

- a. Children and educators are surrounded by negative adult attitudes about math.
- b. Foundational ECE coursework has limited math-specific content.
- c. Courses are limited and vary in availability.
- d. Data in MERIT and other databases are limited or fragmented – making it difficult to make data-informed decisions.
- e. Coaches and trainers may need support first.
- f. Promising approaches need expansion to reach more educators.



Conclusion and Next Steps

DCYF used this analysis to make recommendations in the *Washington Early Math Professional Learning Options*. The recommendations are a culmination of EMC and DCYF identified opportunities from this landscape analysis.

The recommendations can help DCYF and other state partners explore how to enhance and develop early math practice professional supports for early learning educators.

Appendix A: List of Focus Group Locations and Interviews

Focus Groups

- ECEAP Numeracy Training Participants (Coaches, Coaching Supervisors)
- ESD Early Learning Coordinators
- (Bellevue) Preschool Providers in New WAC Training
- (Pasco) Child Care and Preschool Providers in New WAC Training
- Professional Development Coordinators
- WAEYC Child Care and Preschool Providers

63 individuals (42 White, 18 Latinx, 2 Black, 1 Asian-American; 59 Women, 4 Men)

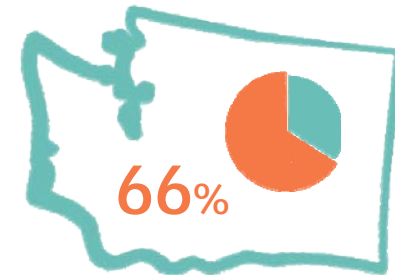
Interviews

- Kendra Lomax, University of Washington Inspire
- Krissy Kim, President – Early Childhood Teacher Preparation Council
- Laura Chandler, Early Achievers Coaching Supervisor
- Michelle Roberts, DCYF PD Manager
- Mike Kasprzak, Early Achievers Coaching Supervisor
- Rose Tiller, Early Achievers Coaching Supervisor
- Soleil Boyd, University of Washington Cultivate Learning, Early Childhood Education Consultant & Researcher
- Tracy Collins, Early Achievers Coaching Supervisor
- Xyzlora Brownell, ECEAP Training & Capacity Specialist

9 individuals (7 White, 2 Black; 8 Women, 1 Man)

THEORY OF CHANGE

WASHINGTON'S EARLY MATH COALITION



Early math achievement is one of the strongest predictors of later school and life success. Yet only 66% of children in Washington State arrive in kindergarten with the mathematics skills to start school ready.*

As local and state partners, we learn together and collaborate to positively impact children's early math development.

STRATEGIES

- Promote public awareness and attitude initiatives that build everyone's confidence and enjoyment of math.
- Maximize family activities that promote early math.
- Strengthen professional practice in early math.
- Increase organizational and system capacity for early math learning.

LONG-TERM OUTCOMES

- Adults see themselves and the children in their lives as mathematicians.
- Adults have confidence in and take enjoyment from math.
- Family experiences form a strong and expanding foundation for children's experience of math.
- Professionals provide appropriate, responsive skill development in math.
- Systems provide equitable opportunities responsive to diverse needs for early math learning that all can access.

GOAL

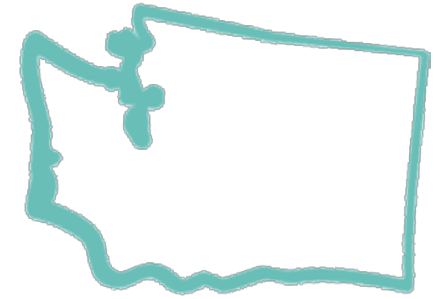
All children experience enjoyment, confidence, and success in their development of math ability from prenatal through 3rd grade and race and income are no longer predictors of early math success.



*as measured by the WaKIDS assessment.

PRINCIPLES OF ACTION

WASHINGTON'S EARLY MATH COALITION



As local and state partners, we learn together and collaborate to positively impact children's early math development.

LEAD WITH EQUITY

Prioritize those furthest from opportunity. Disrupt systemic and institutional racism by identifying and challenging practical, cultural, and structural barriers to opportunity.

CENTER FAMILIES AND EDUCATORS

Encourage children's math learning by taking an asset-based approach that builds upon the experience, efforts, and success of families and educators.

ORGANIZE A COLLECTIVE EFFORT

Include and balance the diverse interests of partners, while advancing a common vision, aligning efforts, and acting to improve outcomes for children.

FOCUS ON WHOLE CHILD AND FAMILY

Children's math enjoyment and learning is embedded in overall healthy development in the context of relationships and culture.

CULTIVATE ADAPTIVE SYSTEMS

Promote and be responsive to diverse needs of children, families, and professionals, learning from experience and evaluating data to inform decisions and recommendations.

INSIST ON QUALITY

Positive math outcomes derive from high-quality guidance, tools, and practices shown by community experience and/or research to be effective.

Appendix C: Thrive Washington Early Math System and Resource Analysis



Early Math System and Resource Analysis

Key Insights and Recommendations from the Field



November 2018

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ACKNOWLEDGMENTS

The *Early Math System and Resource Analysis* was produced by Thrive Washington in partnership with the Department of Children, Youth, and Families (DCYF) and Washington STEM. Funding for this project was provided by The Boeing Company.

Thrive Washington is grateful for the critical thought partnership and contributions provided by members of the Early Learning Regional Coalitions and the Early Math Coalition Steering Committee including: Michelle Roberts (DCYF), Carlin Llorente (Washington STEM), Garrison Kurtz (Dovetailing), Greta Bornemann (Puget Sound ESD), Rachel Eifler, Amber Havens (OSPI), Karma Hugo (OSPI), Sandy Maldonado (Child Care Aware), Julie Rolling (Association of ESDs), and Paula Steinke (SOAR).

BACKGROUND: Why Math Matters

We know that early exposure to high-quality learning is essential for building the strong foundation that children need to succeed in school and beyond. A growing body of research shows that children who attend high-quality preschool programs are less likely to utilize special education services or be retained in their grade. They are also more likely to graduate from high school, go on to college, and succeed in their careers than those who have not attended high-quality preschool programs (Bakken, et al., 2017).

While early childhood education has often centered around reading and behavior, research is now elevating math as being the strongest predictor of future academic success (Duncan, et al., 2007). In fact, children who received high-quality math instruction in preschool scored higher on third-grade test scores in math *and* in reading (Duncan, et al., 2007).

According to the Washington Kindergarten Inventory of Developing Skills (WaKIDS), math consistently proves to be our students' greatest challenge. Only 66% of students entering kindergarten in Washington are demonstrating the math skills expected for their age. For children living in poverty, this number drops to 50%. Likewise, there are significant gaps in math-readiness across racial groups. For example, less than half (47%) of Hispanic and Latino children begin kindergarten with the skills they need to succeed in math, as compared with 73% of their white peers. For some students this creates an unsurmountable hurdle. Studies have shown that the achievement gap widens between disadvantaged and advantaged children as they move through the grade levels, further perpetuating the problem (Davison, et al., 2004).

This disparity has nothing to do with the inherent capabilities or potential of children. It is a direct reflection of the level of access children have to foundational early math experiences that are engaging, developmentally appropriate, and supported both in and out of the formal education system.

PROJECT OVERVIEW: Purpose and Objectives

The *Early Math System and Resource Analysis* was designed to identify key people, activities, and resources supporting early math learning for both children and adults in Washington. All information collected was organized and analyzed to accomplish two primary objectives:

1. Increase stakeholder awareness of key strengths and opportunities that exist in the state.
2. Generate recommendations to the field about how to prioritize efforts in the future. The primary audiences for this analysis are funders, policy-makers, and professionals who provide early math support for caregivers, educators, and families.

Following is a list of the products generated through this project, all of which are included in this report.

- **Inventory of Existing Early Math Systems and Resources.** A spreadsheet containing a complete list of the early math assets (people, activities, and resources) identified through this project. Assets are classified by type, primary audiences served, and geographical service area. The ten regions that are referenced throughout this report are based on Early Learning Regional

Coalition boundary lines, which are similar to the boundary lines for Educational Service Districts. Refer to the Appendix for a map of regions.

- **Online Map of Early Math Systems.** Follow this [link](#) to access a dynamic, online map that identifies the locations of early learning systems that were commonly referenced as having a dedicated focus on math.
- **Heat Map of Kindergarten-Readiness in Math.** A map of Washington school districts that is color-coded based on the percent of students who exhibited the expected math skills of a child entering kindergarten, according to WaKIDS, in the 2017-2018 school year.
- **Asset Maps.** Maps of Washington Counties that illustrate the density of identified family support programs and professional learning programs that are focused on math.
- **Report and Recommendations.** A report presenting the landscape analysis of data collected during this project, including observations and insights about strengths and opportunities, and recommendations for key stakeholders.

The Early Learning Regional Coalitions (ELRCs) served as the primary source for data collection. The ELRCs support local organizations and communities by connecting their efforts with the [Washington state Early Learning Plan](#), strengthening partnerships, and building capacity to reach more children and families. It is important to note that while the data collected do not offer a complete view of what's happening in each corner of the state; they do represent a broad sample of the go-to people, activities, and resources identified by ELRC leaders and their local partners.

As such, the results of this project are intended to complement and build upon existing data collection efforts being conducted by the Department of Children, Youth, and Families (DCYF) and Washington STEM. Collectively, these products will help to paint a fuller picture of the current state of early math learning in Washington. They serve as tools to help identify promising strategies for increasing kindergarten math-readiness and third grade math-proficiency, with a focus on children furthest from opportunity. Additionally, they will provide a framework for the development of a longer-term, more dynamic solution that can help stakeholders identify educational assets and align efforts across state agencies and with local partners.

In the short-term, the results of the *Early Math System and Resource Analysis* will be utilized by the Statewide Early Math Coalition (EMC). The EMC is an alliance of approximately sixty statewide and regional partners who are responsible for moving the needle on early math outcomes. They will use the data, insights, and recommendations to drive action around each of the four coalition strategies, including: building awareness and enjoyment of math, expanding family opportunities that promote math, strengthening professional practice, and increasing organizational and systems capacity. Work groups have been formed around each of these strategies, where members can work together to accomplish goals that are aligned with the goals of their respective organizations, while building upon the unique strengths that each member brings to the table.

ACTIVITIES and METHODS

This analysis is based on reference data such as the Washington Kindergarten Inventory of Developing Skills (WaKIDS) and DCYF Early Achievers (the state's Quality Rating and Improvement System for licensed child care programs), and on information provided by Early Learning Regional Coalition leads through interviews to better understand their view on the two primary objectives mentioned above.

The analysis additionally draws upon recommendations and insights offered by members of the Early Math Coalition Steering Committee.

The overall method of the analysis included the following key activities:

Data Collection & Organization

Review of Existing Data Collection Efforts. The first phase of data collection involved a thorough review of information that had been gathered between 2016 and 2018 including, interviews conducted by Thrive in 2016 with leaders from the Early Learning Regional Coalitions to inform their role in the early math landscape, interviews done by Washington STEM in 2016 to inform the launch of their early math initiative, and a written compilation of early math activities led by Early Learning Fellows during the 2017-2018 school year. This collection of notes highlighted several people, organizations, activities, and tools that play a role in supporting early math learning across the state. Each of them was compiled into one master spreadsheet that served as a valuable starting place.

DCYF Survey. Additional data was collected through a statewide survey conducted by DCYF in May of 2018. The survey was developed in partnership with Thrive to align with the goals of this landscape analysis. It was sent to the members of the statewide Early Math Coalition, who then distributed it to their local partners. The survey resulted in the identification of 45 additional assets, which were added to the master spreadsheet.

WaKIDS Data Review. 2017-2018 WaKIDS data was pulled from the [OSPI Report Card](#). It was organized by county to identify areas where children are more and less consistently exhibiting the math skills needed to succeed. It was also organized by demographic subgroup to identify populations that appear to be furthest from opportunity.

Early Learning Coalition Interviews. Thrive conducted interviews with nine out of ten of the Early Learning Regional Coalition leads. Leads were encouraged to invite up to three partners from their region to participate in the interview. Each regional team was sent a preliminary snapshot of the data that had been collected from their region to date, as well as WaKIDS data specific to their region. The interview questions were designed to meet three goals: (1) to ensure a good representation of the early math resources that are currently available across the region; (2) to gain an understanding of existing high-leverage strategies and priorities in the region, and (3) to gather insights about the supports or actions considered most critical to advancing early math for the various communities served.

Interviews were recorded and transcribed; then the information shared was coded and organized into five broad themes: (1) equity in early math, (2) promoting positive perceptions of math, (3) expanding family engagement, (4) strengthening professional practice, (5) increasing organizational and systems-level capacity. Themes two through five are aligned with the foci of four Work Groups that have been formed by the statewide Early Math Coalition as a way for partners to proactively and collaboratively engage with strategies that are aligned with the goals of their respective organizations. The first theme, equity, serves as an overarching goal that ultimately drives the purpose and design of all strategies being developed and executed by the EMC.

Refer to the Appendix for a full list of Interview Participants and a copy of the Agenda and Interview Questions.

Data Organization. The full dataset was classified according to a predefined list of primary categories (People, Activities/Events, and Resources) and sub-categories, which are unique to each primary category. The full list of Categories and Definitions can be found in the Appendix. Assets were then tagged by counties served, Educational Service District, and Early Learning Coalition region. As much as possible, they were also tagged based on primary and secondary audiences served. It is important to note that some survey respondents created a unique record for each county being served by a given person, activity, or resource, resulting in up to 7 records for that one asset. Other respondents created one record to name the asset as being active in their region, resulting in one record for that asset. This type of inconsistency in data reporting causes some regions to appear to have fewer assets than they have in reality. The full data set was used in this analysis and therefore, reporting of these data will focus more on the types of activities available rather than the number of activities.

Qualitative Analysis and Reporting

Data Analysis. Thrive worked in partnership with the Early Math Coalition Steering Committee to determine how best to present the data of key people, events, and resources to meet the strategic planning needs of the coalition work groups. Visual representations of the data have been created in the form of charts, graphs, and maps, and are available in the Results section of this report. These graphic representations help to illustrate the types of assets that were reported through the data collection methods described above, and the various locations of statewide systems that were pulled from online reference data, like Parent Child Home Visiting Programs and ECEAP and Head Start Centers.

Analysis of Interviews. Once organized into themes, the information shared during interviews by Early Learning Coalition teams was further organized to elicit the key insights and recommendations provided in this report.

Early Math System and Resource Analysis Report. This report contains key insights about the state of early math learning in Washington, an analysis of the strengths and opportunities that exist, and recommendations to the field. The results described in this report were presented to the Early Math Coalition and shared with the Early Learning Regional Coalition leads for feedback, which is reflected in this final version.

RESULTS

This section contains the data and key insights that were collected and developed using the methods described above. The results of this analysis are organized into five themes, presented in the following order: (1) Equity in Early Math, (2) Promoting Positive Perceptions of Math, (3) Expanding Family Engagement, (4) Strengthening Professional Practice, and (5) Increasing Organizational and Systems-Level Capacity.

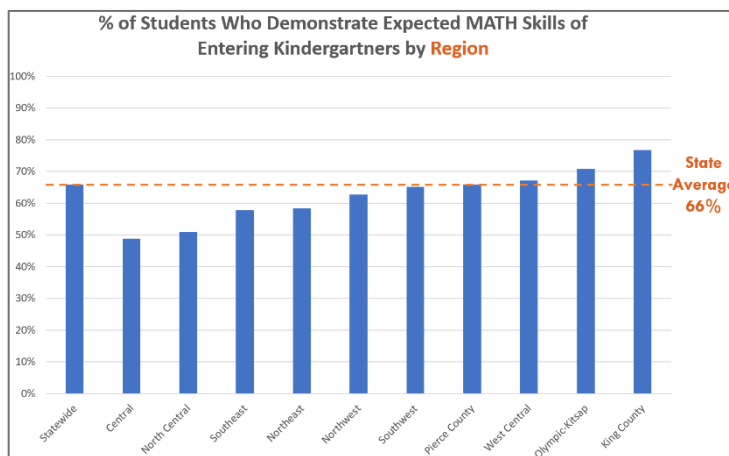
Disclaimer

When reviewing the following results, it is important to consider the everchanging nature of the education landscape. From the rapid development of new products and professional learning offerings, to the high turnover rates of personnel. At any given point in time, it is safe to assume that some data presented in this report may soon be outdated. It is also important to note the inherent limitations of a

data collection process, like this, that relies primarily on survey participation and interviews. While the participants brought to the process a broad range of knowledge and experiences related to early math learning and teaching, the information presented in this report does not claim to provide a complete view of the state of early math in Washington. Rather, it is a snapshot of the key people, activities, and resources that support early math learning in the communities they serve, and a summary of what they consider the highlights of existing work and top priorities for future work.

1. Equity in Early Mathematics

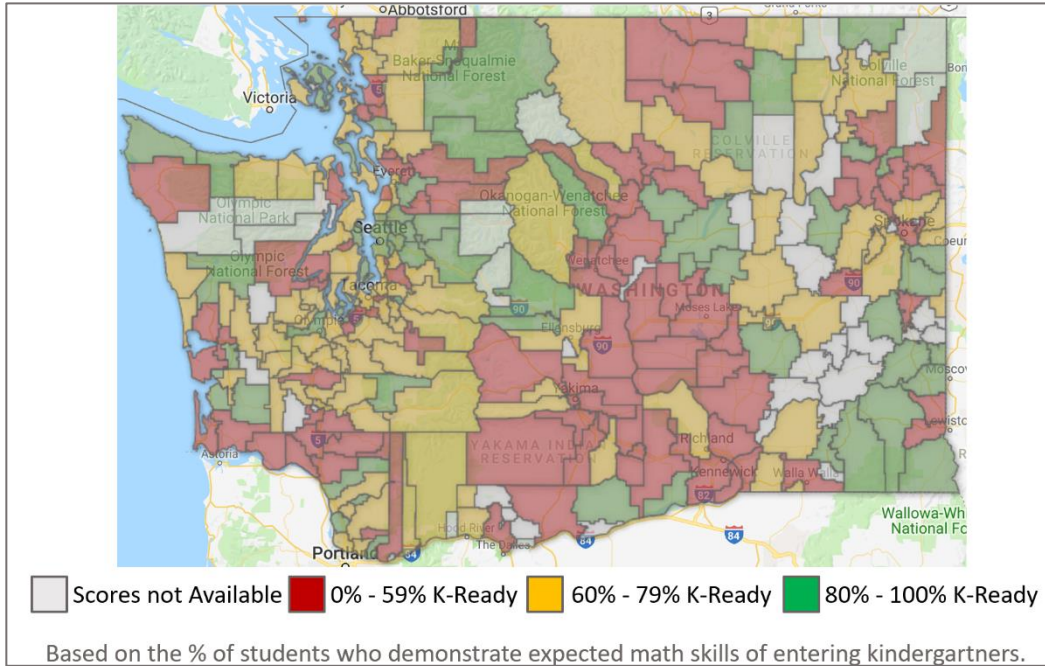
One prominent theme that is consistent across all regions in the state, is the need to design and implement early math supports that are equitable, meaning they are designed to meet children where they are, in ways that are both engaging, culturally relevant, and developmentally appropriate. But first, we need to know where children are when they arrive. This requires a close look at what the data communicates about which populations of children appear to be entering kindergarten with the early math experiences they need to flourish, and which do not.



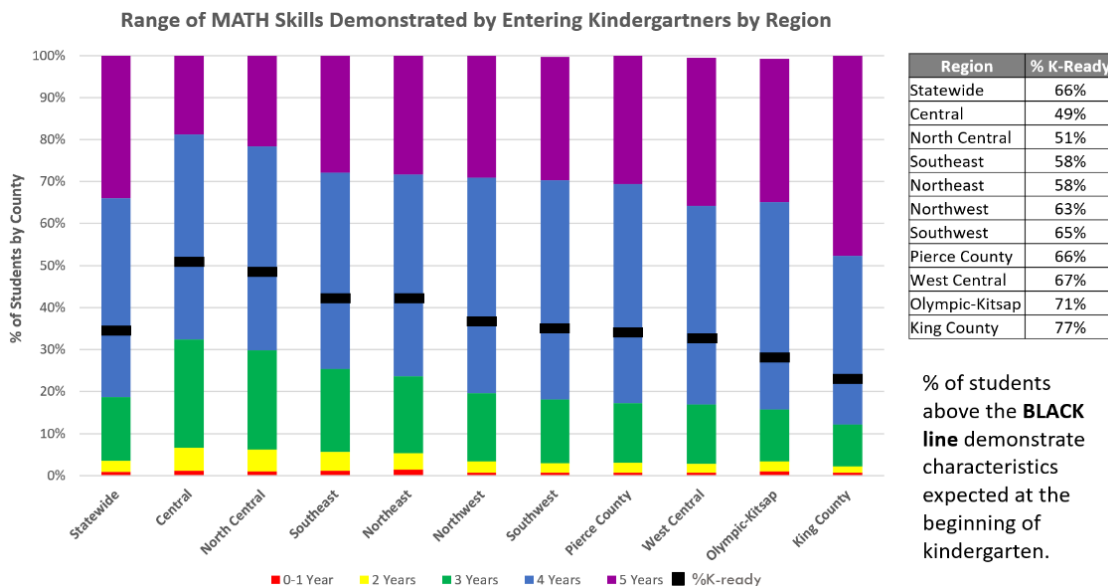
At the beginning of the school year, all kindergarten teachers in the state use the Washington Kindergarten Inventory of Developing Skills (WaKIDS) to determine the skills and strengths of their students. By observing students engaged in everyday activities, teachers identify the range of skills exhibited, which are classified by the age when those skills are expected to be mastered. The results of this assessment provide detailed information that assists teachers in designing plans to support

student growth. At the beginning of the 2017-2018 school year, only 66% of students in Washington arrived with the math skills expected of students entering kindergarten. There is a 28% gap between the highest average from King County at 77% and the lowest average from the Central region at 49%.

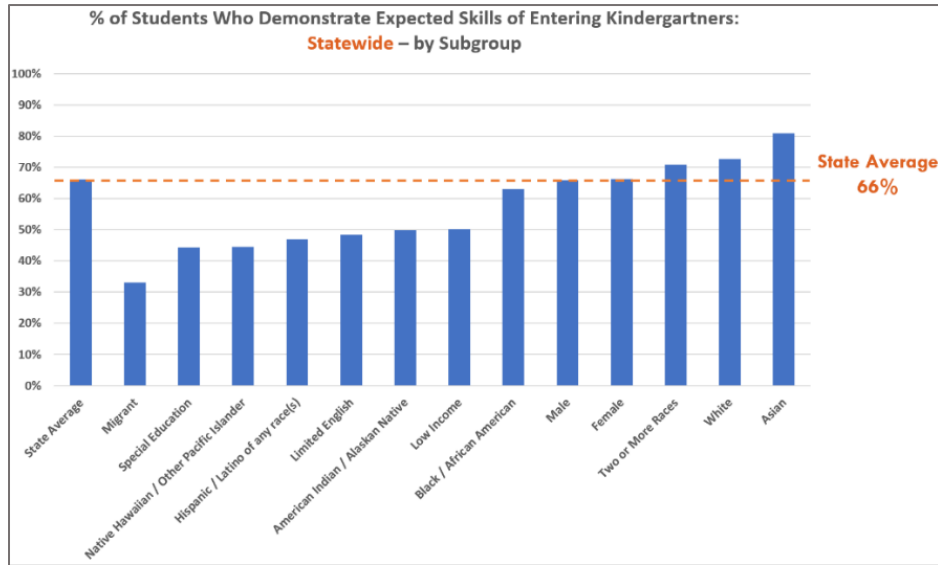
The map below shows kindergarten-readiness in math by school district. Scores are not available for school districts reporting results for fewer than ten children or for school districts that had not submitted their results at the time data was pulled to generate this map. This map sheds light on the areas that could benefit from additional or improved early math interventions as well as those that may offer models of promising programs and practices.



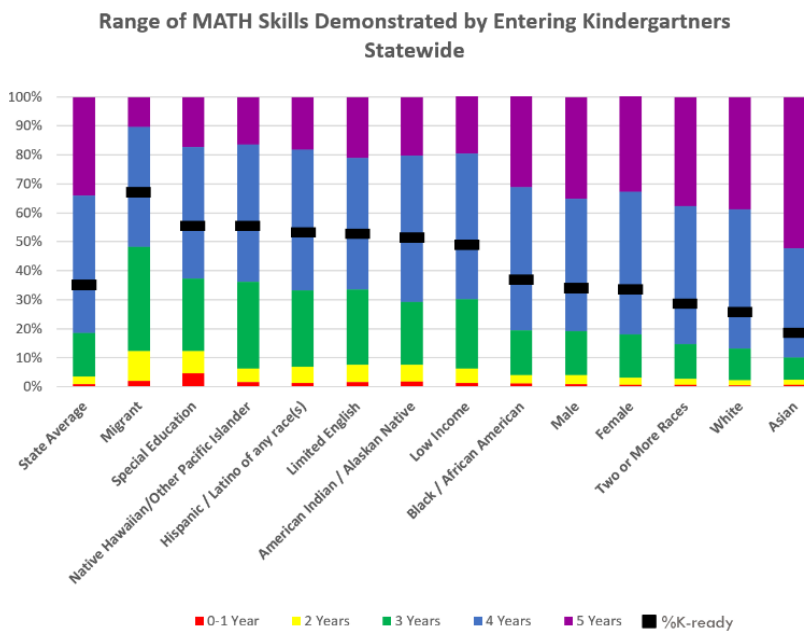
It is helpful to go beyond basic kindergarten-readiness to look at the actual breakdown of skills by age group, as shown in the graph below. Kindergarten-readiness is determined by a combination of skills expected of four- and five-year-old children. Nearly 20% of students in the state are entering kindergarten with the math skills expected of children three-years old and younger. For each region below, the students above the black line are considered kindergarten-ready in math.



The data can be broken down even further, by demographic subgroups. The graph below shows a 47% gap between the highest performing subgroup (Asian) and the lowest performing (Migrant). There is a 36% achievement gap across racial groups, with only 45% of Native Hawaiian / Other Pacific Islander arriving K-ready in math as compared with 81% of their Asian peers.



Achievement gaps become even more clear when looking at the range of math skills being demonstrated across different demographic subgroups. 30% of children living in poverty arrive to kindergarten with the skills expected of children three-years-old and younger. When looking across racial groups, only 18% of Hispanic/Latino children exhibit the math skills expected at five years of age, compared with 39% of White children and 52% of Asian children.

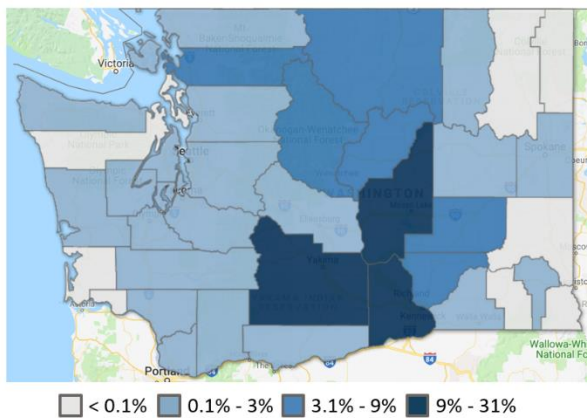


Demographic Subgroup	% K-Ready
State Average	66.0%
Migrant	33.0%
Special Education	44.4%
Native Hawaiian/Other Pacific Islander	44.5%
Hispanic / Latino of any race(s)	47.0%
Limited English	48.5%
American Indian / Alaskan Native	49.9%
Low Income	50.2%
Black / African American	63.0%
Male	65.9%
Female	66.2%
Two or More Races	70.9%
White	72.7%
Asian	80.9%

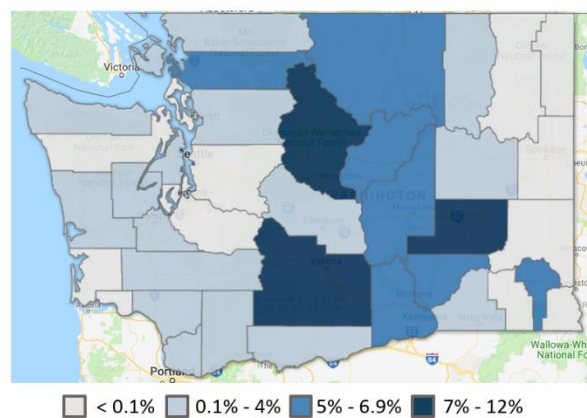
% of students above the **BLACK** line demonstrate characteristics expected at the beginning of kindergarten.

By layering demographic data with what we know about where students live, we can begin to paint a more complete picture of the various factors that may be impacting students being served within given communities. Two subgroups that Early Learning Regional Coalition leads identified as high-priority groups were migrant students and those with limited English. The map on the left shows where the highest and lowest percentage of migrant students live, by county, based on the total number of migrant students in the state. Of the 1,130 migrant students living in Washington, 31% are living in Yakima county, 15% live in Benton county, and 10% live in Grant county. The map on the right shows the concentration of migrant students relative to the total population of kindergartners within each county. Yakima, Chelan, and Adams counties have the highest concentration of migrant students. Economic hardship and high mobility are among the biggest challenges for these students. The educational discontinuity that they experience creates a need for programs and services that are flexible and available from anywhere (“[Meeting the Educational Needs of Migrant Students](#)”).

% of Migrant Students by County

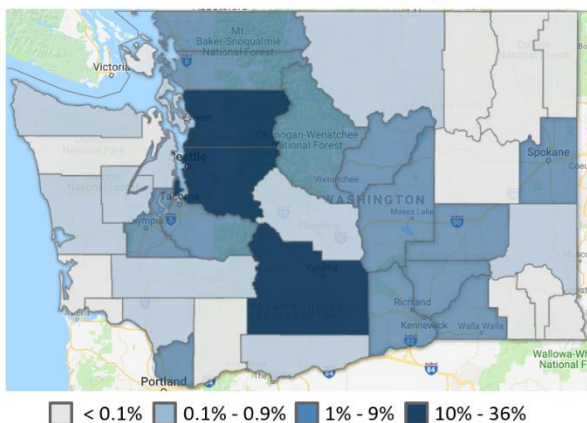


Concentration of Migrant Students

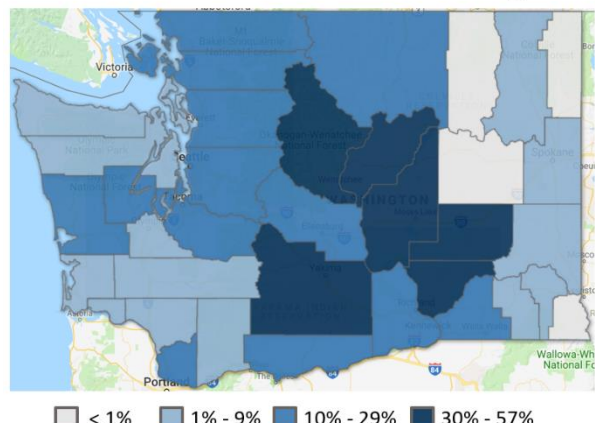


This next map shows the distribution of students with limited English proficiency. Of the 16,448 kindergartners with limited English proficiency in Washington, 57% are living in King, Snohomish, and Yakima counties, with a clear majority (36%) living in King county. When looking at the concentration of kindergartners within each county, Adams, Chelan, Yakima, Grant, and Franklin counties are each serving a cohort where more than 40% of kindergartners have limited English proficiency.

% of Students with Limited English



Concentration of Students with Limited English



The more we know about the children we serve, the better. It is critical to consider all forms of data available when trying to identify the types of educational interventions that are most needed within a given community. Achievement gaps, like those shown above, are being analyzed across the state to identify barriers that may be limiting certain populations from accessing information and resources to support early math learning within their communities and across the system.

The goal of the statewide Early Math Coalition is for ALL children to enter kindergarten and reach third grade with the confidence and skills needed to succeed in math. Additionally, they aim to close the opportunity and achievement gaps, where gender, race, language, and other demographic factors are no longer predictors of math readiness.

Time and money aside, what do you consider to be our biggest BARRIERS in achieving equitable outcomes in math and what is being done in your region to address these barriers?

Barriers to Achieving Equitable Outcomes

Each Early Learning Regional Coalition (ELRC) team was asked to share what they consider to be their biggest barriers in achieving equitable outcomes in math. The following barriers were identified.

Universal Acknowledgment that Institutional and Structural Racism Exists. There is still a percentage of people who do not share the belief that groups of people within their community are being favored by or disadvantaged by the policies and practices that exist within the education system. These perspectives, identified by areas that are less racially diverse, make it challenging to center discussions around issues of equity and choose actions that are focused on breaking down long-standing systems and processes that negatively impact certain groups of people and more specifically, racial groups.

Limited Knowledge About Equitable Solutions. While all regions noted that they are actively working to build their awareness of the inequities present in their communities, they acknowledge that they still have a lot to learn about how to identify the problematic policies, structures and practices that exist, and perhaps even more to learn about how to identify and implement those that are equitable.

Limited Knowledge of Cultural Competency in the Classroom. There is a general perception that too few educators and caregivers have been trained to know how to create an inclusive classroom environment that honors and builds upon the voices and experiences of all children in the room – both visually and through culturally responsive teaching practices. It's one thing to understand what it means to be culturally responsive and believe that it's important, and a whole other thing to know how to do it.

Lack of Understanding about How to Connect with Families. There is a general lack of understanding about how to connect with families in authentic and meaningful ways, specifically those not connected to the formal education system.

Insufficient Support for English Language Learners. All regional partners shared concerns about the lack of people and resources they have access to, to better serve the large numbers of English Language Learners in their community. This is particularly true in cases where many different languages are spoken.

Uncertainty About the Validity of WaKIDS Assessment Data. There are questions about the accuracy and efficacy of the WaKIDS assessment data, given that it is an observation-based assessment that may be unintentionally skewed by implicit biases.

How Barriers Are Being Addressed

Systems-level Focus on Equity. The Early Learning Regional Coalitions, the Early Math Coalition, the Association of Educational Service Districts (AESD) and all nine Educational Service Districts (ESDs), and a large percentage of school districts reported that they are actively engaging in conversations about equity and learning how to apply an equity lens to their work. The following activities were described by the majority of ELRC teams during the interviews.

- **Shifting Perspectives.** School Districts and ESDs are talking about the need to shift the perspective from an expectation that people need to fit into the system to an expectation that the people in the system need to take action to make it work better for people.
- **Building Knowledge.** School districts and ESDs are participating in book studies using books like, *Courageous Conversations About Race* and *Culturally Responsive Teaching and the Brain*.
- **Analyzing Data.** School districts and ESDs are using data to understand systemic inequities and they are coaching district and school leaders to lead these efforts.
- **Focusing on Strengths-Based Approaches.** Puget Sound ESD was referenced as a leader in using a strengths-based approach when working with districts and schools on equity. They have developed a powerful equity statement and a [Racial Equity Toolkit](#) that are serving as models for others. Teaching Strategies Gold was also noted as being a good example of a strengths-based approach.

“We’re working on how to shift the expectation that people need to figure out how to fit into the system and focus instead on what the system can do to work better for more people.”

~Northwest ELRC

Community-level Focus on Equity.

- **Play and Learn Groups.** A variety of play and learn group models can be found across all regions in the state including Kaleidoscope Play and Learn, Play to Learn, Paint to Learn, and 123 Grow and Learn. These groups are typically led by facilitators who live in the communities they serve and who speak the languages of their target populations.
- **Family Discussion Groups.** Zeno is exploring family engagement strategies through Family Discussion Groups in Snohomish and King County, where they intentionally seek out and include input from families to design family development strategies. They are also involved in the Black Family Voice Project, which is using the [Community-Based Participatory Research](#) method.
- **Community Cafes.** Community Cafes are bringing family and community voice to the table with policymakers in several regions. This approach is being practiced in neighborhoods, early learning and child care settings, tribal centers, schools, faith-based organizations, and social service systems. In the neighborhood, Community Cafés are typically parent-hosted gatherings where participants contribute to guided conversations relevant to their own community.
- **Math Messages for Families.** Southeast is working to develop training for ECEAP and Head Start teachers to build skills that support effective family engagement, with a focus on how to communicate messages about math with families.

- **Home Visiting Programs.** The Parent-Child Home Program (PCHP) and Parents as Teachers (PAT) program are two models identified as effectively supporting families that are not connected to other systems. In both cases, trained professionals visit families in their homes or in community settings to provide information and support related to children’s healthy development. They support healthy parent-child relationships while providing information on the importance of early learning and encouraging connections to other information, services, and supports in the community.
- **Community Health Initiative.** While they are not necessarily sharing an early math message with families, the Community Health Initiative in the Southwest region was called out as a good model to look at when seeking to develop strong family partnerships. A strength of the model is their focus on finding natural leaders in the community, those who are respected and often speak the same language as the communities they serve, to be the conduits of information between systems and families.

2. Promoting Positive Perceptions of Math

Some common math messages that are a simple earshot away from impressionable children include: people are either born with a math brain or they’re not; It’s okay to be bad at math because very few adults use it anyway; and I was never good at math, so I don’t expect you to be either. These messages create negative perceptions about math that are difficult to unravel and that impact the ways children engage with math. We need to transform these unfortunate narratives about math into positive ones and create opportunities for adults and children to experience the joy and beauty of math. In a blog post published on Psychology Today, Dr. Judy Willis writes that, “Joy and enthusiasm are absolutely-essential for learning to happen—literally, scientifically, as a matter of fact and research.” She also suggests that by “...building positive emotional connections with math, children will go from captives of math negativity to captains of their math minds” (Willis, J., 2016).

What things do you currently do that are focused on changing peoples’ perceptions of math?

When asked what they’re currently doing to focus on changing peoples’ perceptions of math, the Early Learning Regional Coalition (ELRC) teams shared the following activities and general messages.

Public Messaging Strategies

Three broad public messaging strategies were identified, both of which involve partnering with local businesses that are frequently visited by families, to share positive math messages and offer engaging activities.

Everyday Language and Literacy Opportunities (ELLO). [ELLO](#) is a community research campaign out of the Education Department at EWU. Primarily focused on promoting literacy, ELLO creates engaging and interesting visuals that help parents and other adults have meaningful conversations with kids while in everyday spaces, like the grocery store or on the bus. They are beginning to incorporate ideas around math.

Math Anywhere! [Math Anywhere!](#) was developed out of ESD 112 to promote early math learning in family-friendly businesses, like pizza parlors and doughnut shops, while instilling the mindset that math is fun. Local stores and restaurants display cards that offer fun math activities relevant to the items they sell.



Reach Out and Read (ROAR). In the Spring of 2018, ROAR added math enrichment activities to their range of services through a program called, Books Count. Consistent with their literacy initiative, ROAR provides books and training for doctors and nurses to promote positive parent-child interactions during the period of rapid brain growth and development between birth and age five, and in a space where 91% of children visit at least once per year. Through Books Count, physicians can share about the importance of early math skills and model strategies for using books to engage young children in mathematical thinking.

Promoting Positive Perceptions of Math with Families

All nine ELRC teams identified a variety of family engagement activities that provide opportunities to promote positive perceptions about math. These events range from one-time, light-touch events to regularly scheduled events that offer deeper levels of math engagement.

Community Events. Annual community events, like STEM fairs and Block Fest, were described as a great way to increase general awareness about math in the context of a larger event that offers a broad selection of fun games and activities for adults and children to enjoy together.

School-Based Events. Several school districts across the state offer family math nights, as a fun way for teachers to engage families in math games that students are playing at school, in the hopes they will be inspired to play at home. Non-profit organizations, like Zeno and Math for Love, work with schools to support these types of events by providing resources and/or facilitating.

Family Listening Sessions. Zeno is working in communities served by the Northwest ELRC and King County ELRC to conduct family listening sessions. During these sessions, they engage families in conversations to better understand their math language and experiences to ultimately inform the development of more culturally relevant games and activities. Experiences like this position families as experts and build their confidence.

Infusing Math in Play Group Activities. There is a widely held belief that the best way to promote positive math experiences is through established programs that families enjoy for reasons beyond math. Play and Learn groups, 123 Grow and Learn, and Paint 2 Learn are all regularly scheduled activities that are facilitated by trusted people from the community, in the context of existing relationships, and in places families enjoy visiting.

Promoting Positive Perceptions of Math with Educators

Sharing Positive Math Stories. Both the Olympic-Kitsap ELRC and King County ELRC discussed efforts to support educators in becoming good storytellers. By learning to document and share the types of math activities that kids are engaging in, caregivers and teachers can open parents' eyes to what their kids can do in math, while providing concrete examples of what it looks like to engage young learners in math.

Early Learning Fellows' Action Plans. The focus for Early Learning Fellows during the 2017-2018 school year was mathematics. Though the specific number was unknown by interview participants, it was shared that some action plans were specifically focused on supporting their peers to engage families and the broader community with positive math experiences.

Coaching. Early Achievers coaches across the state are working with educators from Head Start, Early Head Start, and ECEAP programs, to build their confidence in math. It is believed that if educators learn to have fun with math, they will be more inclined to provide math experiences for their students in ways that promote positive math mindsets. These coaches travel to childcare center sites and classrooms to help educators practice strategies that utilize the space and resources readily available to them.

Messaging Themes

There was an incredible amount of alignment across ELRCs about the types of math messages that need to be heard. The following suggested headlines are reiterated throughout this report. They are messages that can benefit all stakeholder groups.

Math Starts Early. Kids need math experiences well before kindergarten and they need a better understanding of the kinds of math skills that will help them be successful in Kindergarten.

"Many parents are surprised to see their students behind when entering Kindergarten because they didn't have the info they needed about learning expectations for their kids prior to starting Kindergarten." ~ Central ELRC

"Thinking back on some literacy stuff – we've engaged all levels of society about the importance of literacy, like the commercial that showed a dad pulling his child in a wagon and reading signs as they walked by. We need that for math. Those visuals go a long way".

~Southwest Early Learning

Math is Playful. Math is not about memorization or prescribed routines. Math is fun and playful. Demystify math language and concepts by providing images and stories about what it looks like for young children to play with math. It's equally important to provide examples for adults about how to respond to children when they're playing with math concepts.

"Children are so naturally curious, so a lot of the math comes automatically if they're given the right cues to explore that. Your response to them can either lift up and raise that curiosity or it can hinder them." ~ Northeast ELRC

Math is Everywhere. People need to see that math is already part of their daily lives. Images need to involve everyday items, in everyday spaces.

"It's not about math time or fancy tools and curriculum – it's about using math language and noticing math when the opportunity arises during regular play." ~ Northeast ELRC

Build Confidence Through Positive Experiences. Create opportunities for caregivers and educators to develop their own positive math narratives through experiences that are open-ended and engaging.

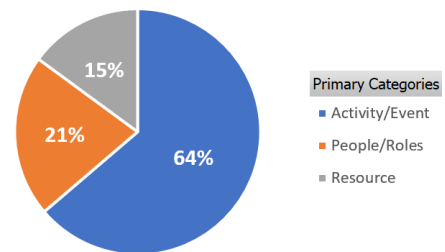
Confidence can be built around those experiences, before introducing specific math vocabulary and skills.

3. Expanding Family Engagement

As a child’s first teacher, parents and caregivers play a critical role in the early math landscape. This is particularly true when considering that over half of the children who enter kindergarten in Washington, approximately 59%, have not participated in a preschool program. Fortunately, more and more family engagement programs are adding math to their repertoire, and a select few are solely focused on promoting early math learning for families and extended families. However, it is still not sufficient to meet the needs of all children.

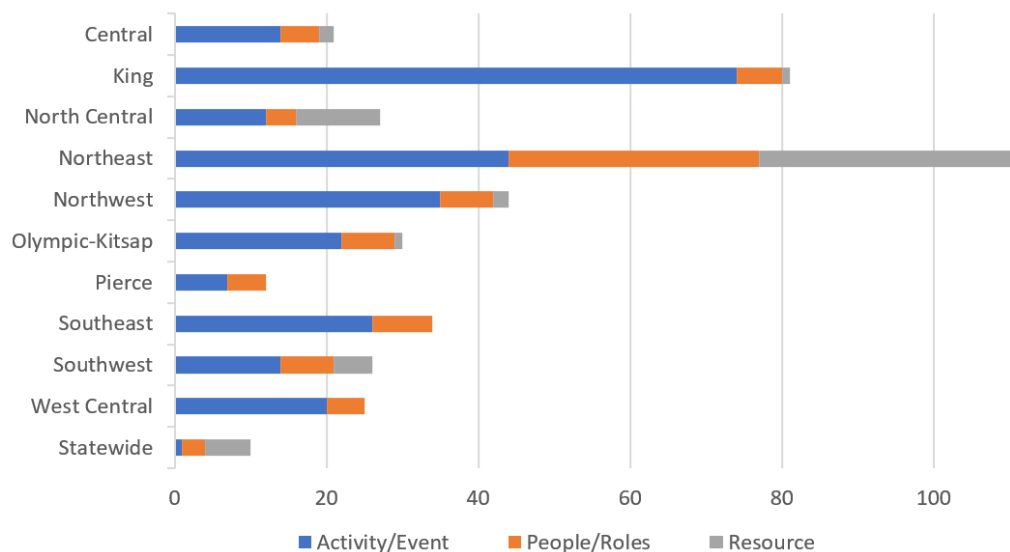
Among the 764 assets included in the Assets Inventory, 55% were tagged as serving children and families. Activities and events make up 64% of them. 15% are resources that are specifically designed to be used by families; and 21% are the people or roles that are dedicated to serving families.

Assets Serving Families



Of the 422 assets that were tagged as serving children and families, 412 of them were also tagged to specific regions. The graph below shows the distribution of family support assets reported across ELRC regions. Due to the variation of data reporting practices across regions, programs that are offered more than once and those taking place across several locations, like Kaleidoscope Play and Learn groups, are only counted once per region. The ten assets tagged as serving statewide are shown on the bottom row and consist mostly of resources.

Distribution of Assets Serving Families

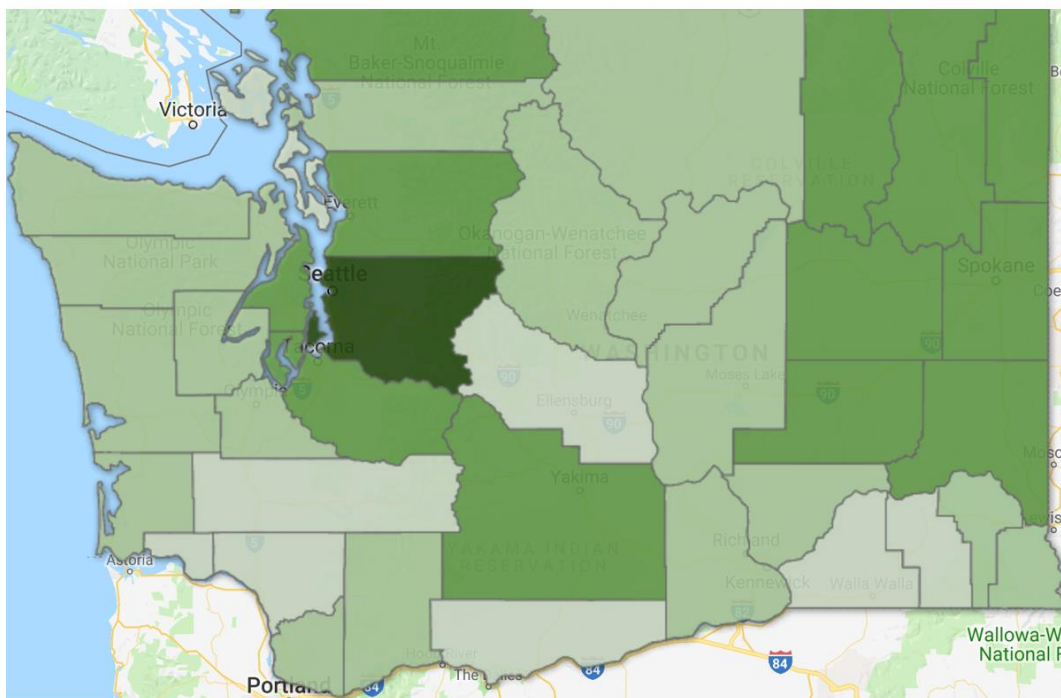


The map provides a visual representation of the number of family-focused assets reported for each county. This

map is useful to consider alongside the table above. However, we cannot place too much weight on the number of assets reported for any given county or region due to inconsistent reporting methods, as noted under Activities and Methods. For example, some programs were reported as serving all counties within a given region, regardless of the number of families served within each county. There is reason to believe that while a program is technically available to serve all counties within a region, barriers could exist that prevent participation from families living in far-reaching counties. Refer to the Appendix to view the data used to develop this map.

Imagine if the state could develop a method for collecting data in a dynamic and sustainable way that allows stakeholders to compare apples with apples. It would be particularly useful, if this data also included the number of children and families served to generate a map of assets, relative the population. Until better and more accessible data exists, this map serves to identify areas where additional data collection efforts are needed, and it also serves as an example of the kind of data that stakeholders want.

Assets Supporting Families by County



0 – 4 Assets
 5 – 10 Assets
 11 – 25 Assets
 > 25 Assets

Based on the # of local assets reported. Assets tagged as “statewide” are not included.

The following table provides specific examples of the people, activities, and resources that are primarily focused on supporting the family, friends, and neighbors who influence children’s early math experiences at home and in the community.

Primary Categories	Sub-Categories	Examples
Activities & Events	Community Events	<ul style="list-style-type: none"> • Block Fest (Available statewide through Child Care Action Council) • MATHFEST (Available statewide through Zeno) • Valleyfest (Organized by a non-profit in Spokane Valley)
	Family Support	<ul style="list-style-type: none"> • Play & Learn Groups (KPL, Play to Learn, Paint to Learn, 123 Grow and Learn) • Home-based Programs (Parent Child Home Visiting, Ready! for Math) • Math Storytimes (offered through libraries) • Family Math Events (PreK Family Nights, Zeno’s Family Math Night Series, LEARN Academy, Migrant Education Program)
	Student Support	<ul style="list-style-type: none"> • After-School or Out-of-School Programs (STEM Camps, Mobius STEM Workshops) • Summer Programs (Summer Jump Start, PreK Summer Program)
People	Direct Service Providers	<ul style="list-style-type: none"> • In-School/Childcare: Teachers, Childcare Providers • Out-of-School: Library Services Managers, Play and Learn Facilitators, Home Visitors
Resources	Games/Activities	<ul style="list-style-type: none"> • Mathematized Reading (Storytime STEM, Bedtime Math) • Math Games (Tiny Polka Dot, Zeno Games) • Promote Everyday Math (Which One Doesn’t Belong?, Math Anywhere!) • Home Resources (Math Bags, Math Kits, STEM Kits)
	Outreach/Messaging	<ul style="list-style-type: none"> • ELLO (Everyday Language and Literacy Opportunities – Math ideas for families in public spaces) • Math Anywhere! (Math activities through family-friendly businesses) • Books Count by Reach Out and Read (Math strategies for families through physicians)
	Resource Libraries	<ul style="list-style-type: none"> • Vroom, Zeno’s Early Math Toolbox, Sproutable

ELRC teams were asked to discuss what they believe is most needed to increase awareness about the importance of math for the families and caregivers in their region. Below are key insights based on the information they shared.

Focusing on families and caregivers specifically, what is needed to increase awareness about the importance of math?

Messaging Themes

When talking about increasing awareness, the following themes rose to the top of the list because they are important, and they are not yet considered universally understood among the families served by interview participants. It is important to consider the messages themselves, as well as the mechanisms used to deliver the messages, to ensure they are reaching the families that are less connected to formal systems.

Early childhood is a critical time for learning. Children are capable of learning math at a young age and prove to be naturally curious about mathematical concepts.

“One of the most optimal times to connect with families is during the time from pregnancy to birth. This is when all parents are engaged in the system and their motivation and interest in their child’s development is high.” ~Southwest ELRC

What It Means to Be Kindergarten-Ready in Math. Families need clear and concise communication about what children should know and be able to do in math, to be successful in kindergarten.

“In the swirl of busy home lives and the overwhelming number of things to attend to when raising children, math can too often qualify as “school learning” and therefore doesn’t need to happen until children reach Kindergarten.” ~Southeast ELRC

What Parents Can Do to Prepare Their Children. Parents need quick tips for how to engage their kids in age-appropriate mathematical thinking. Simple recommendations about what an adult can do to increase their child’s chances of success (e.g., the math equivalent of “read 20 minutes a day”.) These recommendations need to incorporate regular daily activities, using ordinary materials – not specialized math manipulatives.

Strategies to Increase Math Engagement with Families and Caregivers

ELRC teams consistently shared the following recommendations based on their own experiences and what they hear from the families and caregivers they work with.

Meet Families Where They Are. Be creative about where and how families are engaged. As a system, we are not able to serve all children by going through the usual channels. While programs taking place in schools and libraries, and other organized family event spaces fill an important need, they are not sufficient. Too many families do not find these programs and services to be accessible for reasons of time, distance, interest, and most notably, because they may not be culturally relevant. Find the places where families are comfortable and where they're already choosing to go; and infuse math into these already successful programs.

"The mission of Project Child Success is really about nurturing relationships and environments – which always come first. Where these are strong, you can infuse math, and other themes, and they will be well received."

~ Pierce County ELRC

Use Family Voice. Promote models and recommendations for using family voice when designing programs. Provide opportunities for families to identify their needs rather than making assumptions for them. Let the stories of their experiences and strengths be the inspiration for the design of programs and services that will not just simply fill a gap, but that will meet the need. Two interesting examples of how this is being done are described below.

- **Community Cafes.** Community Cafes provide opportunities for families and decision-makers to be in the same room, talking through community solutions. Decision-makers get to learn what families want, what they're already doing, and what could work well for them.
- **Family Discussion Groups.** Currently being piloted by Zeno, these groups are designed to learn from families about what they're already doing and what resonates with them as a way of ensuring more culturally responsive products and programming.

"We use our diverse staff and community partners, who represent and serve our target populations, as cultural brokers. Family discussion groups are conducted in their own language, including Spanish, Chinese, and English. [We] encourage families to consider their own experiences with math and how they engage their children. They teach us what works for them." ~ Zeno, King County ELRC

Family Engagement Examples from the Field

The following examples are being highlighted because they were either mentioned in more than half of the interviews as effective strategies or because they offer a unique solution that may be of interest to the broader stakeholder group. They are presented in order from, light-touch to high-touch.

Light-Touch Strategies. These strategies are considered light-touch because they generally offer short-term engagement and impact, and because they require less dedicated time and resources to implement.

- **Community Events.** Community events can draw large crowds seeking an opportunity to have good-old family fun. Yes, they are light touch and low impact, but they are a necessary step in building awareness about the importance of math while showcasing math resources being offered in the community.
- **Vroom.** Vroom is one of a few online platforms that are specifically designed for families and offer great examples of math activities that families can do at home. Vroom also has a mobile app that offers daily tips.
- **Kindergarten Readiness Workshops.** Hosted by schools and school districts, kindergarten readiness workshops were identified as being a helpful and necessary strategy to familiarize

families with the formal education system while highlighting what kids need to know coming in, and what they'll be learning throughout the year.

Medium-Touch Events. The following strategies offer ways for families to engage in math over a longer period-of-time, whether for a full evening or during weekly sessions, families learn strategies they can use at home.

- **Play and Learn Groups.** There are a variety of play and learn groups that go by different names, but they all share a similar format that gives families materials and space to play. [Kaleidoscope Play and Learn](#) (KPL) is one well-established model that takes place in 91 locations across the state. Child Care Resources (CCR) partners with affiliate family-support organizations to provide guidelines, materials, and consultation to ensure success of the program. In 2018, CCR partnered with Zeno to introduce math games in twelve KPL settings across Whatcom, Yakima, and King counties. Families engaged in math activities over the course of several weeks and were given games to play at home. Evaluation data suggests facilitators and caregivers experienced positive changes in attitudes, beliefs, understanding, and behavior that support early math learning through their participation in the pilot.
- **Family Math Parties.** Generally hosted by school districts, family math parties are being offered across the state with the primary purpose of building confidence and enjoyment of math. They take place in school lunchrooms, gyms, and sometimes in community centers. Families come together to enjoy food and a large assortment of math games. If funding allows, families will sometimes leave with a game in hand.
- **Family PreK Workshops.** Some districts are going beyond information sessions to full-day and sometimes, multi-day workshops that give participants the chance to explore their own feelings about and experiences with math, while practicing ways to engage the children in their lives. These workshops are generally offered to families, caregivers, and preschool teachers, though they currently struggle to get as much parent participation as they would like.

High-Touch Events. The following, more intensive, math-focused experiences offer deeper and more long-term engagement. While the time and cost to implement these strategies is higher, so are the potential gains.

- **Home Visiting Programs.** Home visiting programs are voluntary, family-focused services that pair trained professionals with expectant parents and families with new babies and young children to support the physical, social, and emotional health of children. While there are other home-visiting models available in Washington, the Parent-Child Home (PCHP) program and Parents-As-Teachers (PAT) programs were specifically called out by ELRC teams for incorporating messages about early math into their visits. The frequency with which this happens is unclear, but the opportunity is big, given their reach among families who are furthest from opportunity. These programs were noted as being a particularly good strategy for reaching migrant families, whose life circumstances make other community and school-based events difficult to access.
- **LEARN Academy.** The Othello School District offers a seven-week program for parents with children from birth to three that is focused on child development and parenting skills. The program is offered in both English and Spanish and engages families in research-based workshops focused on brain development, executive function, social and emotional literacy, early numeracy, early literacy, behaviors and discipline, and early interventions. The Southeast ELRC is interested in figuring out how to expand this program.

4. Strengthening Professional Practice

“Learning to count by rote teaches children number words and order, but it does not teach them number sense, any more than singing the letters L-M-N-O-P in the alphabet song teaches phonemic awareness.”
 ~ Deborah Stipek, Stanford

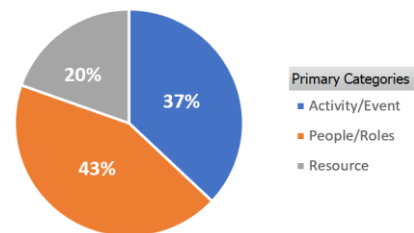
While studies have shown that children who attended a preschool program tend to outperform their peers who did not, research also suggests that the time spent on math instruction in preschool is not sufficient, nor is it sufficient in scope. All too often, math instruction is focused on reciting numbers to the exclusion of other, higher order math skills. Deborah Stipek, a professor from Stanford provides an interesting parallel to reading, *“Learning to count by rote teaches children number words and order, but it does not teach them number sense, any more than singing the letters L-M-N-O-P in the alphabet song teaches phonemic awareness.”*

Math looks very different in classrooms today than it did when most caregivers and teachers were students. Worksheets and timed math facts are being replaced with active, hands-on problem-solving and children talking about their mathematical reasoning. This shift in instruction requires a stronger focus on teaching practices and facilitation skills that encourage students to use, work with, and explore numbers. For this reason, math has been a growing focus of professional learning across the state.

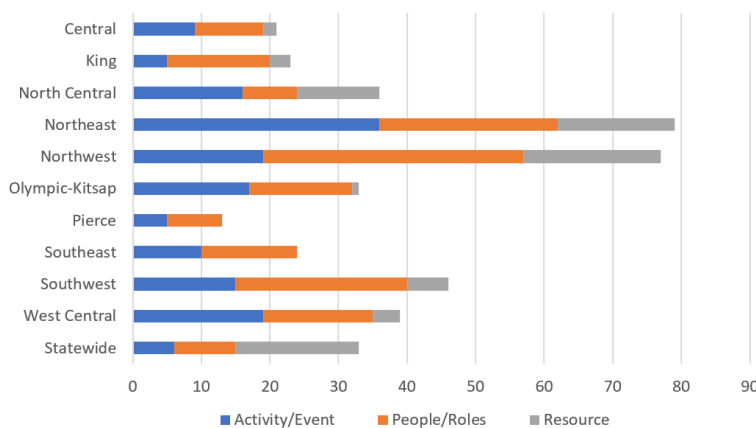
The following data and insights from this analysis capture a fair amount of information about professional development opportunities that exist for early learning professionals in math, but it is not comprehensive. The Department of Children, Youth, and Families (DCYF) is conducting a separate analysis focused specifically on professional learning that will expand upon what is offered in this report.

Among the 764 assets included in the Assets Inventory, 55% were tagged as serving professionals. The term professionals, in this case, refers to licensed child care providers, preschool teachers, and K-3 teachers. 43% of the data reported through this project focused on the people and roles dedicated to serving professionals; the activities and events that professionals are participating in make up 37% of the data; and 20% are resources that are specifically designed to be used by professionals.

Assets Serving Professionals

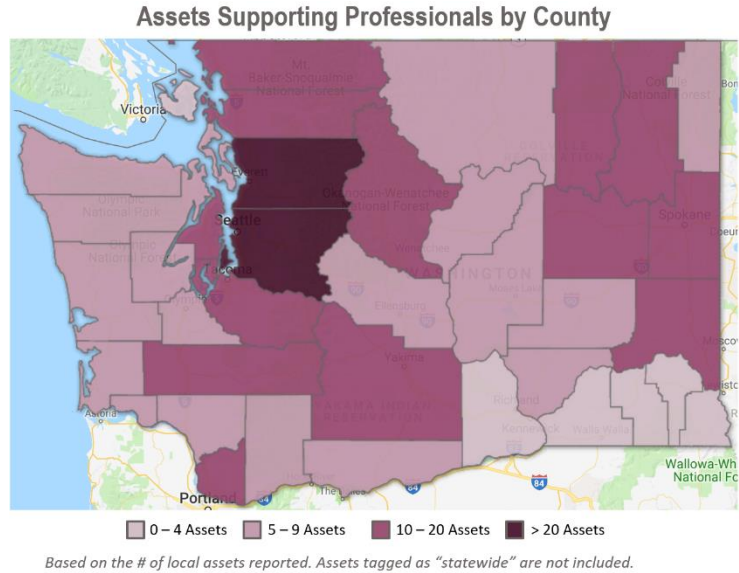


Distribution of Assets Serving Professionals



Of the 424 assets that were tagged as serving professionals, 391 of them were also tagged to specific regions. The graph on the left shows the distribution of assets supporting professionals across ELRC regions. The 33 assets tagged as serving statewide are shown on the bottom row and consist mostly of resources.

This heat map provides a visual representation of the number of assets serving professionals that were reported for each county. As stated previously, this map is useful to consider alongside the table above. However, we cannot place too much weight on the number of assets reported for any given county or region due to inconsistent reporting methods, as noted under Activities and Methods. Refer to the Appendix to view the data used to develop this map.



The following table provides specific examples of the people, activities, and resources that are primarily focused on supporting early learning professionals who influence children’s early math experiences in childcare settings and in classrooms.

Primary Categories	Sub-Categories	Examples
Activities & Events	Professional Development	<ul style="list-style-type: none"> • Early Learning Professionals (STARS Classes, CCA Online PD Academy, Early Achievers Coaches, ECEAP Training, Early Educator’s Conference) • K-3 Professionals (Math PLCs and book clubs, UW Inspire Math Labs, Math for Love PD, Math Curriculum Adoption) • Bridging Early Learning and K-3 (Early Learning Math Modules Training, PreK-K Math Labs, Math Cafes, PreK-K Meet and Greet, Pathways to Numeracy Mini-Lessons)
	Systems-Level Capacity Building	<ul style="list-style-type: none"> • Statewide Conferences (Starting Strong-OSPI, Elevate–CCA, Infant and Early Childhood Conference-IECC, Washington Association for the Education of Young Children Conference-WAEYC)
People	PD Providers	<ul style="list-style-type: none"> • ESD Providers (Math and Early Learning Coordinators) • District Providers (Early Learning Fellows, Math Coaches, TOSAs, and Specialists) • University Providers (Cultivate Learning, UW Inspire) • Non-Profit Providers (Math for Love)
Resource	Assessment	<ul style="list-style-type: none"> • Benchmark Assessment Tools (WaKIDS, TS Gold) • Formative Assessment Tools (Illuminate, Fastbridge)
	Curriculum	<ul style="list-style-type: none"> • Creative Curriculum, Engage NY, Illustrative Math, Bridges in Math
	Framework/Alignment Document	<ul style="list-style-type: none"> • Learning Pathways in Numeracy • PreK-K Transition Report

Primary Categories	Sub-Categories	Examples
	Games/Activities	<ul style="list-style-type: none"> • Mathematized Reading (Storytime STEM) • Math Games (Tiny Polka Dot, Zeno Games) • Promote Everyday Math (Which One Doesn't Belong?, Math Anywhere!)
	Research	<ul style="list-style-type: none"> • Topics (Mathematical Mindsets, Number Talks, Cognitively Guided Instruction)
	Resource Libraries	<ul style="list-style-type: none"> • Early Math Collaborative-Erikson Institute, DREME, The TeachingChannel, YouCUBED, Learning and Teaching with Learning Trajectories [LT]²

ELRC teams were asked to discuss which skills and abilities they think early learning professionals need most to support children’s early math readiness and success. Below are key insights based on the information they shared.

Focusing on the teachers in children’s lives (licensed childcare providers, preschool teachers, K-3 teachers), what skills and abilities are most needed to support children’s early math readiness and success?

Overarching Themes

The following themes were consistently present during conversations about the skills and abilities that early learning professionals need to support early math learning.

Cultural Competency. Through all that is done to support professionals, it’s important to weave in ways to apply a racial-equity lens to engage families in meaningful ways. The more skilled educators are at building relationships with families, the more relevant they can make learning for kids. While there is a lot of discussion about this at the ESD and even district level, it does not seem to be making its way down to the teacher level yet. It is important for professional development providers to provide educators with opportunities to get beyond the theoretical concepts of cultural competency and explore concrete classroom strategies that can be put into practice.

Whole-Child Approach. Math can and should not be isolated. It needs to be explored and talked about in the broader context of child development including: social-emotional learning, cognitive development, cultural and community context, and other content areas where math can be embedded and/or applied.

Bridging the Gap Between Early Learning and K-3. Stronger alignment is needed between early learning and K-3 to provide consistency for children over the years. This consistency is needed to support children’s mathematical literacy as well as the routines and practices that help them make stronger connections with mathematical concepts.

Key Concepts and Teaching Practices

Mathematical Mindsets. Professional development needs to provide educators with the time and space to explore their feelings and attitudes about math. They need opportunities to experience what it feels like to overcome mathematical challenges, so they can understand the importance of creating these learning moments for children. *Mathematical Mindsets*, by Jo Boaler, provides practical strategies and activities to help teachers and parents show all children, even those who are convinced that they are bad at math, that they can enjoy and succeed in math.

"As teachers reevaluate their own potential as learners, they are more likely to embrace new forms of teaching. This helps their students build confidence, develop positive attitudes and, ultimately, achieve better test scores."

~ Jo Boaler

Developmental Pathways. Childcare providers and teachers alike need the knowledge and skills that come with a deeper understanding of developmental pathways in math. They need to understand the range of skills along the continuum from birth through grade three, and the order in which they should be introduced. For this knowledge to be put into practice, guidance should be given about how people learn math and the teaching practices that encourage meaningful engagement for children in developmentally appropriate ways. If given the time and space to grapple with the meaning behind activities, educators can develop the skills they need to connect key concepts through activities in ways that support growth for all students.

The following resources were recommended to support educator's understanding of developmental pathways: Learning Trajectories, First Steps in Mathematics, Early Math Modules, and Number Talks.

Math-Rich Environments. Early learning professionals need to understand how to create a math-rich environment where children freely choose to explore math through play. Math-rich environments offer a variety of objects that can be used to build deeper mathematical understanding. Consider objects that children are likely to have at home or that exist in and around their communities. Ideally, objects reflect the cultural backgrounds of the children and span a broad range of math concepts.

"We've built an understanding that play has to be a part of learning, particularly with early learners, but this seems to get lost in 1st, 2nd, and 3rd. We need to pull play up for first through third graders."

~ Northwest ELRC

Facilitation Skills. Good learning comes from good teaching. Educators would be better served to make use of the curriculum and materials they already have. Time and energy put into professional development should focus on the facilitation skills that teachers can use when children are playing to draw out math concepts and encourage deeper understanding. Good facilitation skills can only be internalized through practice and lots of it. They are skills that are easy to understand in theory, but awkward to execute in the moment.

Early Achievers coaches were highlighted by a few ELRC teams for their strengths-based approach to working with childcare providers and preschool teachers. They work with them one-on-one and get to know them, their environments, and what materials and activities they use. These familiar items and routines set the context for their coaching sessions.

Mathematical Language. Early childhood educators need to build their comfort levels with early math terminology. Beyond learning and understanding math terms, it's important to help educators learn when and how to use them. Strong math language skills are particularly useful in the following ways:

- Strengthen observational skills to better understand what kids know and determine where to go next.
- Strengthen storytelling skills to help educators connect with families and share what kids can do while providing suggestions for how to support their growth at home.
- Help educators bridge the language used in formalized assessments, like WaKIDS, with what they know kids can do when engaged in play-based math.

Professional Learning Recommendations from the Field

Increasing Access. Early learning professionals who are not working through Head Start, Early Head Start, and ECEAP have a particularly difficult time accessing professional development opportunities because their hours tend to be longer, they don't get paid for PD time, and any associated costs must be covered out-of-pocket. The following suggestions were consistently mentioned during interviews as solutions to increase access.

- Host trainings in the evenings and/or on the weekends.
- Offer food and provide materials for them to keep.
- Consider an overview session, where you can preview follow-up sessions that offer opportunities to dig deeper.
- Increase access to trainings through online platforms and video resources.
- Offer Stipends or some form of dedicated funding to support the number of professional development providers needed to make more trainings available, and to cover the cost of time for early learning professionals, who work outside of Head Start and ECEAP.

Increasing Efficacy. Far too often, professional development is delivered as a one-off experience, with little to no time to practice new skills or get support and feedback when given the opportunity to try new strategies in the classroom. ELRC team members who work in professional development shared the following recommendations for increasing the efficacy of learning experiences for teachers.

- Increase access to coaching and coaches where learning can be more individualized and job-embedded.
- Train more trainers to support early childhood educators on instructional practices, so they know how to engage kids in math during play.
- Include relationship building opportunities among peers, where they can serve as accountability partners to encourage the use of new ideas and keep motivation high after attending trainings (e.g., Play Cafes in Pierce County are fostering relationships among child care providers who now share resources across centers).

5. Increasing Organizational and Systems-Level Capacity

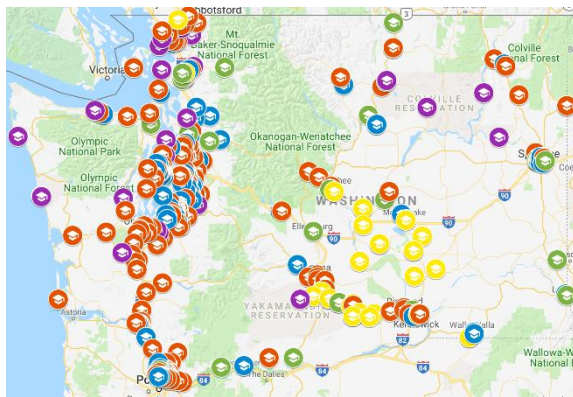
State and regional systems play a critical role in moving the needle on early math outcomes. They are looked upon to provide the vision of what’s possible and the foundational tools and resources to make that vision achievable. This section provides key insights about the types of system-level supports that ELRC teams believe are most needed to bolster early math learning in their regions. Additionally, the table below offers a list of the assets that influence and contribute to the early math eco-system, from a systems-level, as identified by ELRC regional teams and those who participated in the DCYF survey.

Primary Categories	Sub-Categories	Examples
Activities & Events	Professional Development	<ul style="list-style-type: none"> • Early Learning Professionals (STARS Classes, CCA Online PD Academy, Coaching via Early Achievers, ECEAP Training, Early Numeracy Math Modules Training) • K-3 Professionals (Early Numeracy Math Modules Training)
	Systems-Level Capacity Building	<ul style="list-style-type: none"> • Statewide Conferences (Starting Strong-OSPI, Elevate–CCA, Infant and Early Childhood Conference-IECC, Washington Association for the Education of Young Children Conference-WAEYC) • Early Math Coalition Work Groups
People	Direct Service Providers	<ul style="list-style-type: none"> • Head Start, Early Head Start, and ECEAP Preschool Programs • Home Visiting Programs (PCHP, Parents as Teachers) • Kaleidoscope Play and Learn • Washington State Regional Libraries
	PD Providers	<ul style="list-style-type: none"> • ESD Providers (Math and Early Learning Coordinators) • Early Learning Fellows (Early Learning Fellows, Math Coaches, TOSAs, and Specialists) • Child Care Resources
	Systems Level	<ul style="list-style-type: none"> • Statewide (DCYF, OSPI, Early Math Coalition) • Regional (Early Learning Regional Coalitions, STEM Networks)
Resource	Assessment	<ul style="list-style-type: none"> • Benchmark Assessment Tools (WaKIDS, TS Gold, Smarter Balanced Assessment)
	Curriculum	<ul style="list-style-type: none"> • Early Numeracy Math Modules
	Framework/Alignment Document	<ul style="list-style-type: none"> • Learning Pathways in Numeracy • PreK-K Transition Report • PreK-3 Alignment Framework (Framework for Planning, Implementing and Evaluating PreK-3rd Grade Approaches - Kauerz) • First Steps in Mathematics
	Resource Libraries	<ul style="list-style-type: none"> • OSPI Website (Mathematics Instructional Materials, Resources and Course Supports)

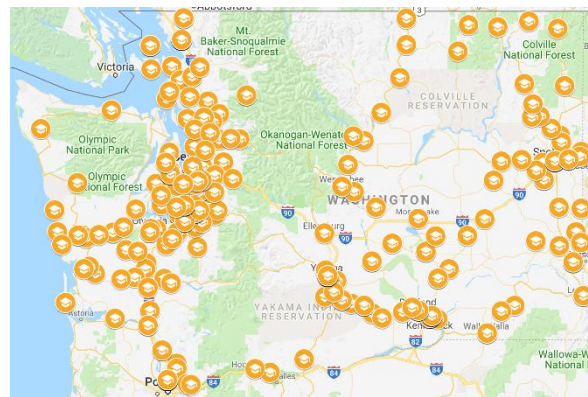
Several early learning systems were identified during interviews as serving or having the potential to serve large numbers of children and families. The maps below illustrate where these systems-level assets exist across the state. Use the following link to view these maps online: <https://bit.ly/2ARaprt>.

Head Start and Early Head Start. There are 80 federally-funded grantees providing Head Start and/or Early Head Start programs through 380 preschool sites in Washington. ([Link to source data.](#))

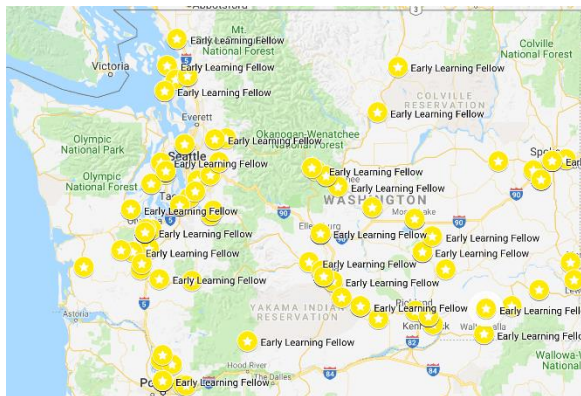
- Head Start
- Early Head Start
- Head Start & Early Headstart
- American Indian & Alaska Native
- Migrant & Seasonal Head Start



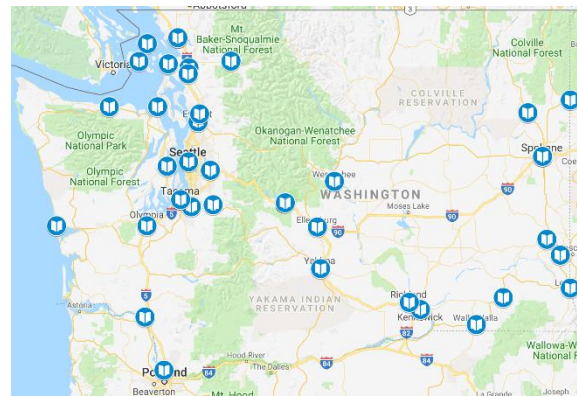
ECEAP CENTERS. During the 2017-18 school year, ECEAP served 12,491 children at more than 360 locations across Washington. DCYF administers ECEAP through 52 contracts with school districts, ESDs, community colleges, local governments, tribal organizations, child care centers and homes, and non-profits. ([Link to source data.](#))



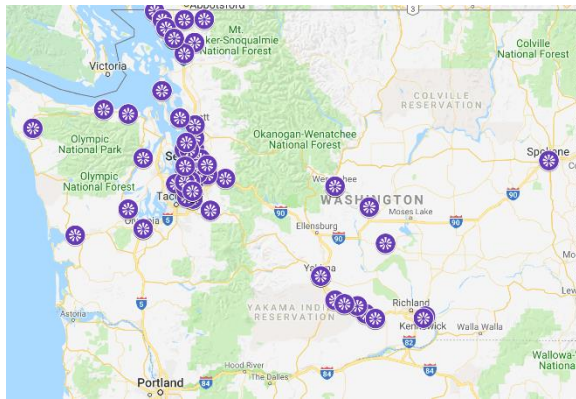
Early Learning Fellows. Based on the most recent count available, there are 199 Early Learning Fellows across Washington.



Library Systems. The Washington State Public Library Systems exist in 38 communities across Washington. ([Link to source data.](#))

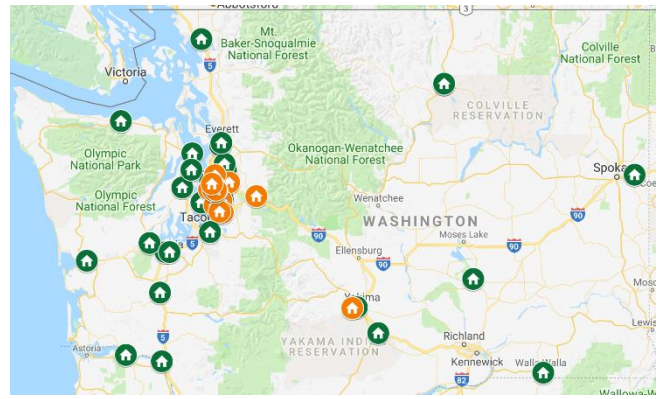


Kaleidoscope Play and Learn. There are 91 KPL sites, 12 of which participated in an early math pilot in 2018 through a partnership between Child Care Resources and Zen0. These sites are in Whatcom, King, and Yakima counties. ([Link to source data.](#))



Home Visiting Programs. Among the eight, state funded, home visiting models, Parents as Teachers (PAT) and Parent-Child Home Program (PCHP) were commonly referenced as programs that are providing parents with information about the importance early math experiences. ([Link to source data.](#))

 Parents as Teachers  Parent-Child Home Program.



When asked about the systems-level supports that are most needed to increase early math outcomes, responses coalesced around three major categories:

What systems-level supports are most needed to increase early math outcomes across the state and in your community?

Convene All Levels of the System

Sustain Coalition Efforts. The Early Learning Regional Coalitions and the Early Math Coalition are perceived as beneficial activities, supporting cohesiveness across state and local-level early math work. Coalitions are providing the time and space to convene cross-sector groups to learn from one another and share the best of what they know about early math learning. Participants were particularly interested in the opportunity to align resources and work on mutual goals with a broader set of perspectives and talents. An additional benefit noted for coalition participation was having access to multiple layers of the system at once, where it becomes possible to get the executive sponsorship needed to move collective work forward, faster.

Integrate Community Voice. There was unanimous agreement among interview participants about the importance of creating opportunities for community members to be at the table with system-leaders and policymakers to ensure that decisions are grounded in the reality of what communities want and need. These must be people who are known in the community and have a vested interest in the community. They can serve as liaisons between the community and those who create or maintain the policies that impact them.

Elevate Importance of Early Math

Build Awareness. Local partners need collateral to communicate the following key messages that can be used across the state.

- Promote general awareness about the importance of early math, targeting families, caregivers, educators, and leaders.
- Produce images and/or videos that showcase the variety of math concepts and skills that young children are capable of.

“We have to come up with community-based strategies together, so policy-makers need to be at the table listening to communities. [We] need connector folks, “bridge builders” –people who can be at the table and are committed to sharing back with their community, and who are seeking information from them to bring back to the group; and we need real resources to pay for their time.”

~Pierce County ELRC

Ensure Access to High-Quality Instruction. While there is an abundance of resources available, there was an expressed need for a central repository of instructional tools and guidance that practitioners can trust have been vetted by state leaders, based on current research about what works. When new resources are developed, they need to be designed to be adaptive to meet local needs while maintaining quality and accuracy of translations. Given the number of early childhood education professionals who struggle to access training, it will be important to find a consistent and reliable way to make training available online. This is particularly important for those who live in remote areas or lack the budget to travel. **NOTE:** *The most requested topic for new training was how to ensure racial-equity for young learners.*

“[We] need modules that everyone has access to online – even childcare providers who could watch trainings in the convenience of their own homes.” ~ Olympic-Kitsap ELRC

Early Learning Funding for All

Support beyond Head Start and ECEAP. Programs like Head Start and ECEAP are highly beneficial, but additional state-funded structures are needed to improve outcomes. Until universally- funded preschool is a reality in Washington, there is a strong need to identify sustainable, local-level funding to support early childhood education alternatives to Head Start and ECEAP.

“We have to look outside of what is inherently the structure of publicly funded programs. Maybe it’s funded differently. What I’d like to see is a stream of income to support local early childhood education programs that can be used flexibly to try things that could be more meaningful and more responsive to our communities.” ~ Southwest ELRC

RECOMMENDATIONS

The following recommendations are based on information collected and analyzed about the early math assets available in Washington and insights gleaned from interviews with ELRC teams.

Funders

- The Early Math Coalition is well positioned to drive positive changes across all levels of the early math landscape, yet funding has not been identified to support its implementation beyond 2019. This group, comprised of approximately sixty volunteers including people from school systems, community-based organizations, universities, and state agencies, is currently being led by representatives from Washington STEM and DCYF. Connect with them to learn about projects that align with your interests or consider contributing to the funds needed to sustain leadership capacity for this group.
- Consider the role you can play in increasing access to high-quality preschool programs and family support programs for children who don't currently have access to preschool.
- Focus on communities of children and families who are furthest from opportunity and prioritize funding to those programs that solicit initial input and ongoing feedback from the communities they serve.
- For many communities, a little funding can go a long way to scale promising or proven programs. Offer mini-grants in high-needs communities to cover the cost of staff, meals, materials (in moderation, given the push to use everyday household items and activities), translations for materials, and stipends to cover participants time and travel expenses.

Policymakers

- As of this year, the Washington State legislature reached its goal to fund full-day kindergarten. Preschool should be next. Identify the funding mechanism that will increase the quantity and quality of preschool programs in the state. Are there public-private partnerships or other untapped revenue streams?
- Consider a local tax that can be used more flexibly to meet the needs of local communities.

Professionals

Professionals Serving Families

- Implement models and recommendations for elevating and using family voice when designing programs and services.
- Work through community leaders, who are trusted by those you aim to serve and forge strong relationships with community-based organizations, who can shed light on the people and places in the community that present opportunities to embed positive math messages and experiences.
- Emphasize everyday experiences and household materials to explore mathematical concepts.

Professionals Serving Educators

- Promote equity and cultural competency when developing training and resources. Go beyond the theoretical concepts and explore concrete classroom strategies that teachers can put into practice to achieve equitable outcomes in early math.

- Lead with play! Adult learners and children alike, need to first develop confidence in math before they can learn to appreciate and enjoy it. This play is needed to undo old, harmful math practices and mindsets.
- Model strong facilitation skills that draw math ideas out of the play that children are naturally engaging in and takes them further.
- Connect all mathematical activities to points along the developmental continuum and support educators to make explicit connects between activities, thus designing clear developmental pathways in support of student growth.
- Whenever possible, design training that can be accessible online to support the large number of childcare providers and early learning educators who cannot attend live trainings.

Systems-Level Professionals

- Raise awareness about why early math education is so important and develop campaign materials that are seen by the general-public and available for local adaptation.
- Narrow in on developmentally appropriate instructional and professional development resources. Vet them for quality and make them accessible to ALL through a centralized, online location.
- Maintain coalition efforts to ensure strong PreK-3 alignment across systems and elevate community voice as a central decision-making strategy.
- Develop a long-term, systematic, and dynamic solution for collecting and sharing information about the variety of resources, organizations, and programs available to support early math learning.

APPENDIX

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Early Math Landscape Analysis | Categories + Definitions

Early math assets have been grouped into three primary categories, each of which have their own unique set of sub-categories. Below are the definitions for each of these categories. Please note that while some assets could fit into more than one sub-category - all classifications were determined based on the asset's primary purpose.

Primary Category	Sub-Category	Definition	
People/Role		People or roles in the community that work to support early math learning.	
	Direct Service	People who directly serve children and families.	
	PD Provider	People who directly serve educators, caregivers, and facilitators.	
	Systems Level	People who primarily serve PD providers or broader statewide programs, policy, and communications efforts (e.g., ESD Early Learning or Math Coordinators, funders, researchers).	
Activity/Event		Activities or events that are either fully or partially dedicated to engaging children and/or adults in mathematics.	
	Community Event	An event that is open to the public and generally serves a specific geographic and/or cultural community. A math specific message or activity is one of many being offered (e.g., Block Fest).	
	Family Support	Activities or events that directly serve parents and extended families with dedicated opportunities to build confidence and competence in math (e.g., play and learn groups).	
	Professional Development	Activities or events that directly serve early learning and P-3 professionals with dedicated opportunities to build confidence and competence in math (e.g., Math Modules training).	
	Student Support	Activities or events that directly serve children, as opposed to those that serve the adults in children's lives (e.g., STEM clubs, exhibits that travel to schools). These data do not capture math interventions offered for students during school hours.	
	Systems Level Capacity Building	Activities or events that directly serve PD providers or systems leaders, sometimes delivered via train-the-trainer models.	
	Resource		A tangible resource or tool that supports early math learning or early math as a field.
		Assessment	Methods or tools that are used to evaluate, measure, and/or document the academic knowledge, skills, or educational needs of students or adults.
Curriculum		Lessons and academic content taught in a school or in a specific course or program.	
Framework/Alignment Document		A document that provides the basic conceptual structure of a system, strategy, concept, etc.	
Game/Activity		Something that is done as work or as play that has a specific learning purpose and outcome.	
Outreach/Messaging		Efforts to share ideas about math or mathematical practices with specific audiences or the general public.	
Research		The results of diligent and systematic inquiry or investigation into a subject, to discover or revise facts, theories, applications, etc.	
Resource Library		A collection of resources that could include such things as: lesson plans, activities, videos, research, and more to promote early math.	

Early Math Asset Map: Agenda + Interview Questions

Introductions + Goals (3 minutes)

Our **goals** for this interview are to:

1. Ensure that we have a good representation of the early math resources that are currently available across your region;
2. Understand existing high-leverage strategies and priorities; and
3. Get your insights about the supports or actions that are most needed to advance early math for the various communities you serve.

Questions (55 minutes)

Orient to and improve upon the current data set. (15 minutes – with anticipated follow-up via email)

1. Is there anything on this list that needs to be removed or updated?
2. What key resources, activities, and people are missing from this list?
3. What is currently being done to assess the quality of these activities?
4. Who should I contact to fill in any missing data?

Seek insight for current and future needs. (35 minutes)

5. What things do you currently do that are focused on changing peoples' perceptions of math?
6. Focusing on families and caregivers specifically...
 - a) What is needed to increase awareness about the importance of math? Where are they going to get information?
 - b) What engagement methods are most effective at supporting quality math engagement at home and in communities?
7. Focusing on the teachers in children's lives...
 - a) What skills and abilities are most needed to support children's early math readiness and success?
 - b) What different strategies or techniques might be needed to prepare different types of providers or providers at different stages in their career?
8. Our goal is for ALL children to enter kindergarten and reach third grade with the confidence and skills needed to succeed in math. Additionally, we aim to close the opportunity and achievement gaps, where gender, race, language, and other demographic factors are no longer predictors of math readiness.
 - a) Time and money aside, what do you consider to be our biggest BARRIERS in achieving this goal?
 - b) What is being done in your region to address these barriers?
9. When thinking about systems-level supports, what things do you think could serve the field best if they were to become more standardized? What things work best when customized at the local level?
10. When thinking about all that you've shared about what should be created or strengthened to best support early math learning – what do you consider a top priority? Why?

Extension questions. (5 minutes)

11. Who else should we be talking to?

12. What have we not discussed today that you think is important for us to know?

Closing (2 minutes)

Review any action items and set expectations for follow-up.

- Tools
 - **Inventory of Existing Early Math Systems and Resources.** A spreadsheet containing a complete list of the early math assets (people, activities, and resources) identified through this project. Assets are classified by type, primary audiences served, and geographical service area.
 - **Online Map of Early Math Systems.** A dynamic, online map that identifies the locations of early learning systems that were commonly referenced as having a dedicated focus on math.
 - **Heat Map of Kindergarten-Readiness in Math.** A map of Washington school districts that is color-coded based on the percent of students who exhibited the expected math skills of a child entering kindergarten, according to WaKIDS, in the 2017-2018 school year.
 - **Asset Maps.** Maps of Washington Counties that illustrate the density of identified family support programs and professional learning programs that are focused on math.

INTERVIEW PARTICIPANTS

ELRC Region	ELRC Name	Interview Participants	Organization
Central	Investing in Children	Lindsay Boswell	Yakima Valley Community Foundation
	Investing in Children	Peter Finch	West Valley School District #208
King County	King County	Jennifer Duval	Child Care Resources
	King County	Katie Sauter	Zeno
	King County	Maile Hadley	Zeno
	King County	Mike Browne	Hilltop Children’s Center
	King County	Paula Steinke	SOAR
	King County	Sarah Felstiner	Hilltop Children’s Center
Northeast	Inland Northwest Early Learning Alliance	Kim Hirning	Community-Minded Enterprises
	Inland Northwest Early Learning Alliance	Mary Ellen Braks	Spokane County Library District
	Inland Northwest Early Learning Alliance	Rachel Eifler	Educational Service District 101
	Inland Northwest Early Learning Alliance	Shannon Blewett	Community-Minded Enterprises
Northwest	Northwest Early Learning	Sarah Southard	Educational Service District 189
Olympic-Kitsap	Olympic-Kitsap Peninsula Early Learning Coalition	Candy Lester	Olympic Educational Service District 114
	Olympic-Kitsap Peninsula Early Learning Coalition	Kim Crummey	Olympic Educational Service District 114
Pierce County	Project Child Success	Brian Humphreys	First 5 FUNdamentals
	Project Child Success	Lisa Conley	Child Care Resources
	Project Child Success	Susan Barbeau	Project Child Success
Southeast	Southeast Early Learning Coalition	Erin Tomlinson	Educational Service District 123
	Southeast Early Learning Coalition	Jenny Kelly	Educational Service District 123
Southwest	Southwest Early Learning (SWEL)	Debbie Ham	Support for Early Learning and Families (SELF)
West Central	Visions for Early Learning	Emily Wilson-Edge	Visions for Early Learning

EARLY LEARNING REGIONAL COALITIONS



Updated 2/21/18

- Pierce County**
Project Child Success
 Susan Barbeau
 253-242-3005(c) | susanb@first5fundamentals.org
- North Central**
 Charity Bergman
 509-662-8261 | charity@uwcdc.org
- Northeast**
Inland Northwest Early Learning Alliance
 Kim Hirning
 (509) 953-0754 | kimh@community-minded.org
- Southwest**
Southwest Early Learning (SWEL)
 Debbie Ham
 360-909-9518 | debbie.ham@selfwa.org
- Central**
Investing in Children: Coalition Central
 Lindsay Boswell
 509-457-7616 | lindsayb@yakimavalleycf.org
- King County**
SOAR
 Paula Steinke
 206-336-6930 | paula@childrenandyouth.org
- Northwest**
 Sarah Southard
 360-299-4045 | ssouthard@nwesd.org
- Southeast**
 Erin Tomlinson
 509-544-5759 | etomlinson@esd123.org
- Olympic-Kitsap Peninsulas**
 Candy Lester
 360-478-6857 | clester@oesd114.org
- West Central**
 Child Care Action Council of Thurston
 Gary Burris
 360-786-8907 X 101 | gary@ccacwa.org

KEY

<p>Coalition Name <i>Alternate name used locally</i> Primary lead Contact info</p>
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HEAT MAP DATA | ACTIVITIES SUPPORTING FAMILIES

County	# of Assets Reported	# of Kindergartners
Adams, WA	15	376
Asotin, WA	5	220
Benton, WA	6	2,637
Chelan, WA	10	859
Clallam, WA	10	637
Clark, WA	6	5,497
Columbia, WA	4	53
Cowlitz, WA	4	1,218
Douglas, WA	6	553
Ferry, WA	15	65
Franklin, WA	9	1,529
Garfield, WA	5	23
Grant, WA	6	1,555
Grays Harbor, WA	5	790
Island, WA	3	934
Jefferson, WA	8	141
King, WA	81	21,489
Kitsap, WA	11	2,527
Kittitas, WA	3	415
Klickitat, WA	4	254
Lewis, WA	3	850
Lincoln, WA	15	133
Mason, WA	7	627
Okanogan, WA	6	537
Pacific, WA	7	198
Pend Oreille, WA	15	79
Pierce, WA	12	10,020
San Juan, WA	1	81
Skagit, WA	5	1,339
Skamania, WA	5	72
Snohomish, WA	21	7,614
Spokane, WA	22	5,391
Stevens, WA	15	305
Thurston, WA	7	3,136
Wahkiakum, WA	4	29
Walla Walla, WA	4	569
Whatcom, WA	14	2,034
Whitman, WA	15	383
Yakima, WA	18	3,864

[Link to online map: Heat Map of Family Activities](#)

HEAT MAP DATA | ACTIVITIES SUPPORTING PROFESSIONALS

County	# of Assets Reported	# of Kindergartners
Adams	7	376
Asotin	4	220
Benton	4	2,637
Chelan	10	859
Clallam	7	637
Clark	15	5,497
Columbia	4	53
Cowlitz	7	1,218
Douglas	9	553
Ferry	11	65
Franklin	5	1,529
Garfield	3	23
Grant	8	1,555
Grays Harbor	7	790
Island	8	934
Jefferson	7	141
King	23	21,489
Kitsap	19	2,527
Kittitas	7	415
Klickitat	9	254
Lewis	14	850
Lincoln	11	133
Mason	5	627
Okanogan	9	537
Pacific	8	198
Pend Oreille	7	79
Pierce	13	10,020
San Juan	0	81
Skagit	19	1,339
Skamania	6	72
Snohomish	35	7,614
Spokane	17	5,391
Stevens	13	305
Thurston	8	3,136
Wahkiakum	6	29
Walla Walla	4	569
Whatcom	15	2,034
Whitman	13	383
Yakima	14	3,864

[Link to online map: Heat Map of Activities for Professionals](#)

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