

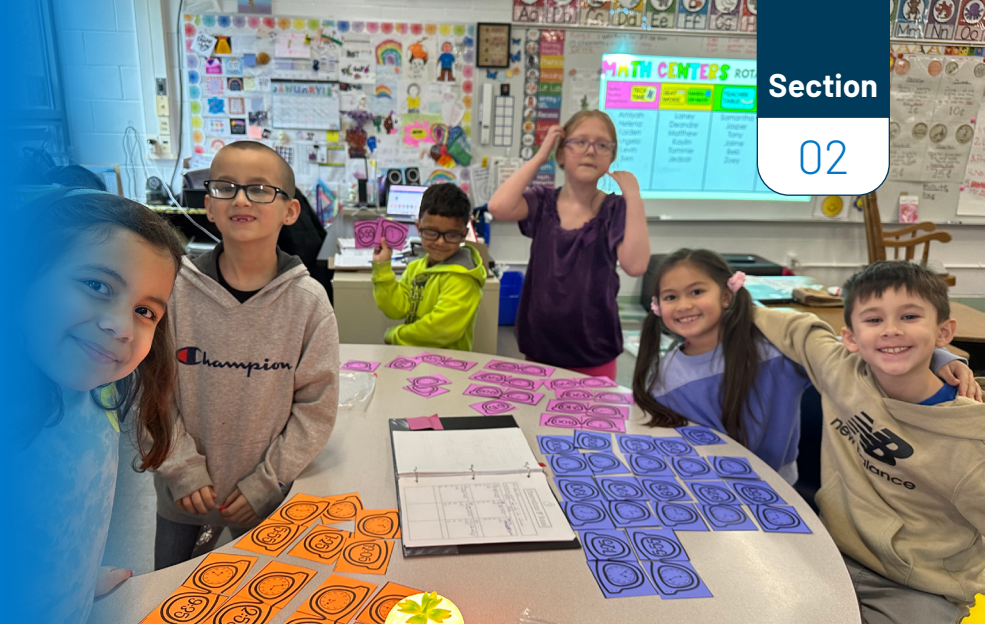


ILLINOIS
STATE BOARD OF
EDUCATION

EDUCATOR PROFESSIONAL LEARNING AND DEVELOPMENT

Section

02



This section is dedicated to **Goal 2**:

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.

GOAL 2 Educators



This section of the plan will cover the following main topics:

1. The Professional Learning Continuum

2. Equity in Professional Learning

3. The Focus of Professional Learning

4. School and District Leaders

5. In-Service Educators

6. Teacher Preparation

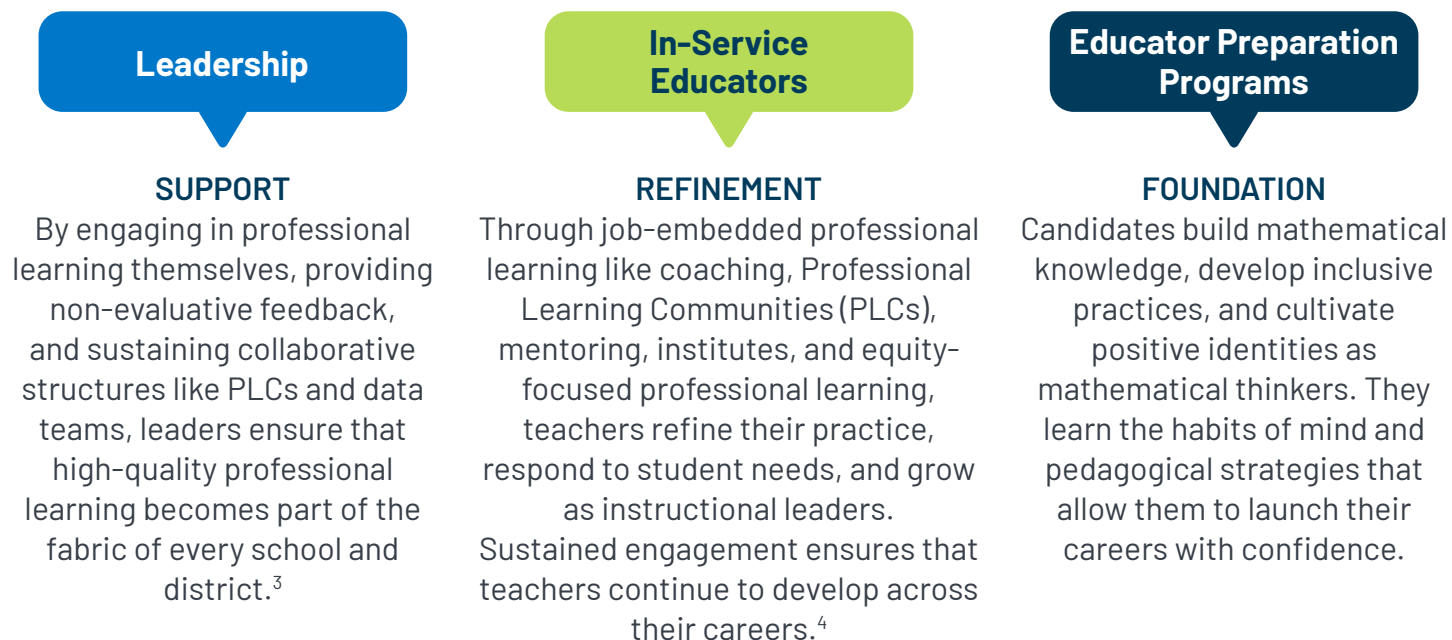
Section Overview

This section focuses on the systems and structures necessary to develop and sustain high-quality mathematics instruction through professional learning. It begins by defining the essential characteristics of effective professional learning and emphasizes the importance of aligning learning opportunities to evidence-based instructional practices. The section then outlines five interrelated domains that guide educator growth, ensuring alignment with the Six Components of Numeracy and the instructional priorities described in Section 1. Central to this work is the professional learning continuum, which recognizes that educator development spans from preparation programs through ongoing in-service learning and leadership roles. Finally, this section highlights the role of administrators in creating coherent, responsive systems of support.

The Professional Learning Continuum

Professional learning in mathematics plays a central role in achieving Illinois' vision in supporting the development of mathematically literate citizens prepared for the demands of the 21st century. Students thrive when educators engage in sustained, evidence-based learning that deepens mathematical knowledge, strengthens teaching practices, and affirms professional and mathematical identities.¹ Professional learning clarifies a shared, evidence-based definition of numeracy: the ability for all students to confidently understand, interpret, and apply mathematical concepts across all domains of mathematics in a variety of real-world and academic contexts. With that lens, teachers design instruction that advances reasoning, problem solving, and confidence.²

This section addresses educator learning across the continuum, from school and district leaders to educator preparation programs (EPPs). High-quality professional learning does not occur in isolated stages. Instead, it forms a continuum that begins in educator preparation programs, deepens through in-service professional learning, and is sustained and extended by school and district leadership. Each stage builds on the last and depends on the others to achieve Illinois' vision for ambitious and equitable numeracy instruction.



Category	Leadership	In-Service Educators	Educator Preparation Programs (EPPs)
Content Knowledge	• Provide and actively participate in professional learning through institutes, Professional Learning Communities (PLCs), coaching cycles, and mentoring alongside educators to model shared commitment and extend knowledge of numeracy • Strengthen teacher content knowledge in applied contexts, including interdisciplinary connections to science, career and technical education, and social sciences	• Actively participate in professional learning through institutes, PLCs focused on numeracy, coaching cycles, and mentoring • Align numeracy instruction and assessments to Illinois Learning Standards for mathematics and SMPs	• Align coursework and clinical experiences with Illinois endorsement standards (23 Ill. Adm. Code 20, 21, 26, 27) and Illinois Licensure Testing System (ILTS) frameworks • Ensure pre-service teachers develop strong content mastery alongside a foundational understanding of mathematical knowledge for teaching
Instructional Best Practices and Pedagogy	• Refine and extend these practices through lesson study, coaching cycles, and induction programs • Support implementation through feedback tools • Align leadership with Professional Standards for Educational Leaders and Illinois Performance Standards for School Leaders	• Engage in instructional routines (number talks, problem strings, etc.) as a learner • Analyze student work collaboratively to identify reasoning and misconceptions • Seek feedback from instructional coaches or content area teams	• Introduce evidence-based practices as instructional approaches supported by rigorous, peer-reviewed research demonstrating a positive impact on student learning • Provide examples such as those outlined by IES



Category	Leadership	In-Service Educators	Educator Preparation Programs (EPPs)
Equity	• Embed Culturally Responsive Teaching and Learning Standards (CRTL) and UDL strategies into ongoing professional learning • Prioritize equity in resource allocation and ensure marginalized students receive targeted support	• Apply CRTL and UDL principles in lesson design • Differentiate instruction for diverse learners • Advocate for equitable access to resources	• Cultivate dispositions that affirm equity and inclusivity
Mentoring	• Offer induction programs and mentoring that reinforce effective practices • Guarantee teachers have protected time and resources for PLCs and data analysis	• Participate in mentoring and peer observation • Use data teams to analyze student progress • Reflect on instructional practices	• Provide clinical practice where candidates rehearse teaching, receive feedback, and analyze student learning
Continuous Improvement	• Evaluate professional learning by collecting feedback, monitoring classroom practice, and analyzing outcomes • Use data from observations and PLCs to guide improvement	• Document growth through portfolios • Share evidence of student learning during PLCs • Engage in continuous improvement cycles	• Require integrative experiences, such as capstones, seminars, or portfolios that demonstrate readiness by connecting content, pedagogy, and equity • Provide opportunities for candidates to self-evaluate their teaching practices and set goals for improvement

Figure 17: Continuum of Professional Learning

Equity in Professional Learning

Equity serves as the foundation of professional learning in mathematics and must be intentionally imbedded across the continuum of educator professional learning.⁵ Professional learning should integrate culturally responsive pedagogy, UDL strategies, and tools for supporting multilingual learners and students with disabilities.⁶ Administrators play a critical role in ensuring equitable access to high-quality professional learning through intentional allocation of time, resources, and supports. Equity-focused leadership includes using data-based decision making, involving educators in the planning of professional learning, and monitoring the implementation of programs and initiatives to ensure professional learning benefits all students. In-service educators must be provided with equitable professional learning that focuses on differentiation, student data, and asset-based approaches.⁷ Educators can also attend to equity by engaging in collaborative learning and identifying and addressing instructional barriers for underserved students. At the pre-service level, teaching educator preparation programs can support equity by embedding culturally responsive pedagogy and inclusive instructional practices. Programs should offer pre-service teachers observation cycles and student teaching placements in diverse school settings. By prioritizing equity, Illinois can reduce achievement gaps and foster mathematics classrooms where every student not only belongs but contributes to learning.

Focus of Professional Learning

Professional learning in mathematics is intentional, comprehensive, and aligned to the developmental trajectory of numeracy as described in the Framework for the Evidence-Based Development of Numeracy Skills. Educators will build numeracy in students by first strengthening their own knowledge, dispositions, and instructional practices. High-quality professional learning develops habits of mind, confidence, and evidence-based practices that bring mathematics to life.⁸

This focus extends beyond content. Professional learning builds teacher identity, advances equity, and connects mathematics to authentic contexts. Teachers benefit when they experience mathematics as learners by engaging in problem solving, reasoning, modeling, and discourse; those experiences translate into instruction that elicits and extends student thinking.⁹

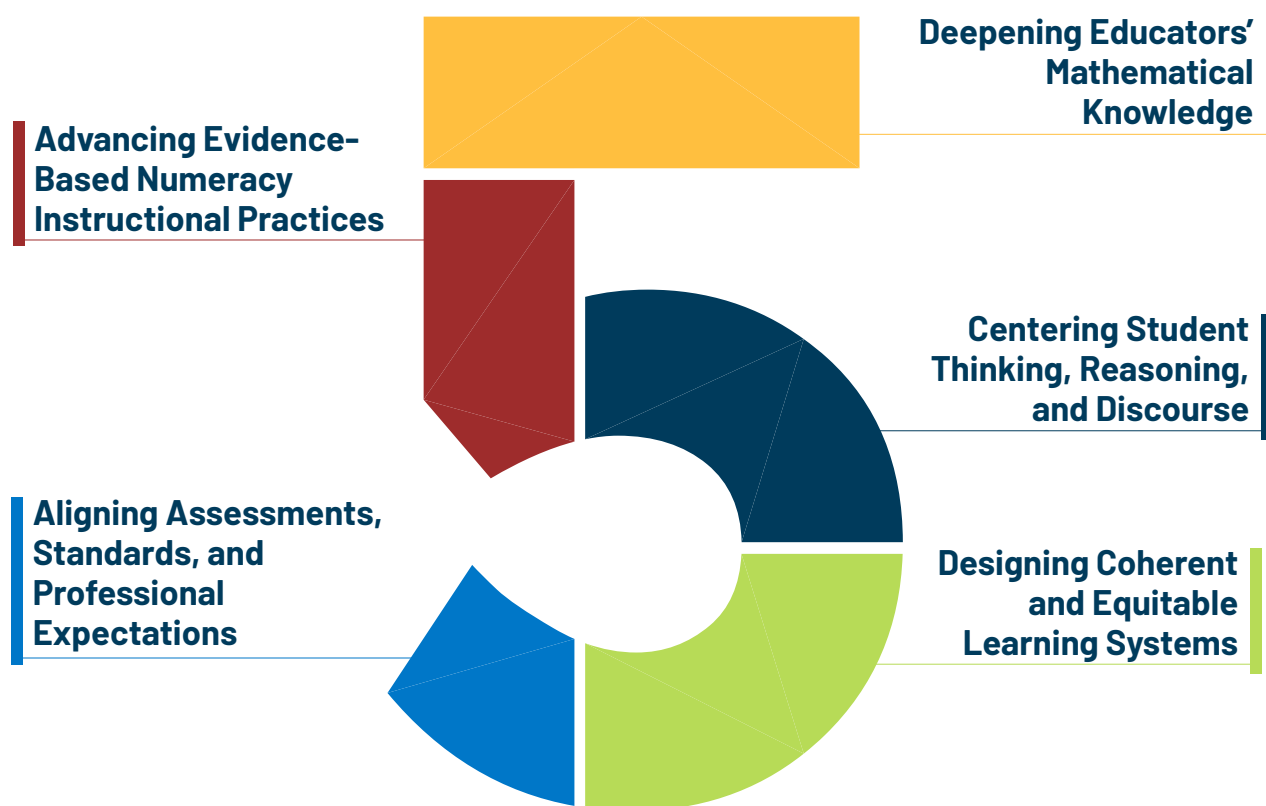
The following pages outline five interrelated domains of professional learning. Each domain includes descriptions of why it matters, what it looks like in practice, and how leaders can support its implementation. These examples are grounded in high-quality professional learning practices but are not intended to represent a single model or approach.



Professional learning should be responsive and dynamic. The needs of educators will vary based on experience, context, and student data, and may shift from year to year. Leaders must know their staff well enough to identify strengths and areas for growth, using that understanding to prioritize, differentiate, and adapt professional learning opportunities accordingly.

These domains are not exhaustive and do not encompass all knowledge and skills educators may need. Rather, they provide a coherent starting point for designing professional learning systems that are aligned to evidence-based mathematics instruction. Professional judgment remains essential in determining how best to support educator growth and, ultimately, student learning.

Five interrelated domains of professional learning:



These domains guide growth across the career continuum and align with the Illinois Learning Standards and national expectations for effective mathematics teaching.¹⁰

High-quality professional learning mirrors the same principles of strong mathematics instruction. It is content-focused, engaging teachers in mathematical ideas and pedagogy; active, providing educators and pre-service educators practice with tools, manipulatives, and strategies; collaborative, creating structures for teachers to learn from and with one another; and sustained, offering ongoing, sequential opportunities for growth.¹¹ Just as students need repeated practice to master numeracy, teachers need time and multiple experiences to master effective numeracy instruction.

Deepening Educators' Mathematical Knowledge

Teachers must first have strong mathematical reasoning themselves before they can support students in developing it. This understanding includes deepening knowledge of numbers and operations, algebra, geometry, measurement, statistics, and probability.¹² Professional learning should allow educators to explore learning progressions, cross-domain connections, and fluent use of representations, such as manipulatives, visuals, symbols, and real-world contexts. Strong learning systems also nurture teacher confidence and positive mathematics identity.¹³ Alignment to endorsement requirements in Illinois administrative code and to Illinois Licensure Testing System (ILTS) frameworks ensures coherence between teacher development and state standards.



Why It Matters

Section 1 emphasizes that numeracy develops through a coherent progression of ideas and the integration of conceptual understanding and procedural fluency, requiring educators to understand not only grade-level standards but how mathematical ideas develop across grade bands and why procedures work. Because early gaps in number sense can compound over time, educators must understand how foundational skills develop to prevent long-term difficulties. This requires more than general content knowledge; educators must develop mathematical knowledge for teaching (MKT) to explain concepts, interpret student thinking and errors, select effective representations, and sequence instruction to build on students' understanding. Research shows that MKT predicts student achievement beyond general content knowledge alone and must be developed through targeted professional learning.¹⁴ Strengthening MKT helps educators avoid practices such as teaching "tricks," premature abstraction, or overreliance on procedures, and instead supports deep, connected, and meaningful mathematical understanding.



Deepening Educators' Mathematical Knowledge

Teacher Actions

- ✓ Engage in math tasks across concrete-pictorial-abstract progressions
- ✓ Study learning progressions across grade bands
- ✓ Analyze how conceptual understanding and procedural fluency build upon one another
- ✓ Explore multiple representations and models as learners
- ✓ Analyze common misconceptions and plan intentional support strategies
- ✓ Identify common early numeracy difficulties and link them to underlying conceptual gaps rather than surface-level errors
- ✓ Participate in professional learning anchored to school/district- adopted high-quality instructional materials (HQIM)
- ✓ Explore how different representations, language supports, and models can increase access to mathematical concepts for MLs, students with disabilities, and students with dyscalculia while also extending thinking for advanced learners

Leadership Actions

- ✓ Prioritize content-focused professional learning
- ✓ Build structures/procedures that promote vertical collaboration and common planning time
- ✓ Provide access to HQIM and professional resources
- ✓ Use tools such as coherence maps and curriculum evaluation tools to anchor learning in standards and maintain coherence and rigor
- ✓ Establish and sustain PLCs with shared goals, ensuring educators collaboratively deepen mathematical understanding and analyze student thinking
- ✓ Ensure professional learning includes a focus on how content knowledge connects to diverse learning needs, including language development, cognitive processing differences, and opportunities for extension

Domain 1 in Practice:

- ✓ A district hires a math coach to lead a summer institute for K–5 teachers. Rather than reviewing curriculum pacing, teachers spend two days doing mathematics aligned to their adopted HQIM: solving problems, using manipulatives, and discussing why procedures work the way they do. The goal is not to cover content but to shift how teachers experience mathematics and to establish ongoing PLC structures where that learning continues into the school year.

Advancing Evidence-Based Numeracy Instructional Practices



Evidence-based instructional practices refer to instructional approaches supported by rigorous, peer-reviewed research demonstrating a positive impact on student learning. Teachers need access to instructional strategies that connect fluency with understanding and promote reasoning. Professional learning should focus on fluency as a progression that moves from counting to deriving to mastery and builds on evidence-based strategies.¹⁵ Educators should experience and enact proven routines like number talks, problem strings, and discourse structures that highlight student reasoning and multiple strategies to solve rich tasks throughout the K-12 continuum.¹⁶ These practices must always prioritize equity, with explicit integration of the [Culturally Responsive Teaching and Leading Standards](#) and UDL so that every student can access rigorous mathematics.¹⁷



Why It Matters

Section 1 defines evidence-based instruction and recognizes that high-quality mathematics instruction draws on a range of evidence-based instructional approaches. Evidence-based instructional practices ensure decisions and methods are grounded in research rather than trends or isolated practices. They promote consistency in instructional quality across classrooms, reducing variability in student learning experiences. Evidence-based instruction must be implemented in ways that ensure all students can access rigorous mathematics, recognizing that students may require different entry points, supports, or extensions.



Advancing Evidence-Based Numeracy Instructional Practices

Teacher Actions

- ✓ Experience and analyze instructional routines
- ✓ Engage in and plan for retrieval practice, spaced practice, and worked examples
- ✓ Compare instructional approaches to determine when and why specific strategies are effective
- ✓ Practice the use of formative questioning and feedback to support reasoning and fluency
- ✓ Practice instructional responses when students do not meet benchmarks (e.g., adjusting instruction, increasing opportunities for practice, targeted small group support)
- ✓ Apply UDL and CRTL principles to design instruction that supports MLs, students with disabilities, and students with dyscalculia while maintaining rigor and providing

Leadership Actions

- ✓ Provide professional learning on evidence-based differentiation and scaffolding, ensuring supports increase access without lowering expectations
- ✓ Provide coaching cycles focused on instructional practices
- ✓ Use walkthrough tools aligned to the Standards for Mathematical Practice and Six Components of Numeracy
- ✓ Establish clear expectations for evidence-based instruction

Domain 2 in Practice:

- ✓ A school builds number talks into its weekly PLC agenda. Teachers facilitate a number talk with their class, bring student response data to the PLC, and debrief together: What strategies came up? Who participated and who did not? What would we change? Over time, administrators ensure this cycle is sustained through coaching and protected collaboration time so teachers refine their use of evidence-based practices.

Centering Student Thinking, Reasoning, and Discourse



High-quality professional learning positions student thinking at the center of mathematics instruction. Teachers study how mathematical strategies develop from early counting through proportional reasoning and functional thinking.¹⁸ They practice eliciting and extending student ideas, orchestrating classroom discussions, and analyzing student work to guide next steps.¹⁹ Professional learning also helps teachers affirm students' mathematical identities and foster agency, persistence, and productive struggle as essential elements of learning.²⁰



Why It Matters

Section 1 positions student thinking as the driver of instruction, emphasizing reasoning and discourse. By centering student thinking, students are positioned as active participants in learning, which can lead to increased engagement and ownership. Centering student thinking requires recognizing that students express understanding in different ways and that language, identity, and learning differences influence how students engage in reasoning and discourse. Prioritizing reasoning and discourse strengthens students' ability to transfer mathematical thinking across contexts by emphasizing explanation and justification.



Centering Student Thinking, Reasoning, and Discourse

Teacher Actions

- ✓ Analyze student work for reasoning, not just accuracy
- ✓ Plan for facilitation of discourse
- ✓ Practice techniques for eliciting and extending student thinking
- ✓ Experience and plan for low-floor, high-ceiling tasks
- ✓ Rehearse teacher moves that promote student-to-student discourse
- ✓ Examine how math anxiety and identity impact student participation and engagement
- ✓ Practice strategies that support participation in discourse for MLs (e.g., sentence frames, visual supports), students with disabilities, and students with dyscalculia while also encouraging advanced learners to justify and extend their thinking

Leadership Actions

- ✓ Normalize use of student work protocols in PLCs
- ✓ Adopt observation tools that look for student thinking
- ✓ Promote grading and assessment practices that value reasoning and explanation
- ✓ Allow teachers to plan and rehearse discourse routines
- ✓ Support classroom environments and professional learning that promote inclusive discourse, ensuring all students have opportunities to contribute and be heard

Domain 3 in Practice:

- ✓ A math coach brings copies of student work from three classrooms to a vertical team meeting. The team uses a structured protocol to sort the work by what it reveals about student understanding, not by correctness, and identifies instructional next steps. Teachers leave with a clearer picture of how reasoning develops across grade levels, while leaders reinforce expectations that PLC time centers on analyzing student thinking.

Designing Coherent and Equitable Learning Systems



Teachers benefit from professional learning that frames mathematics as an interconnected system. Educators should explore how standards progress across grade levels, study cross-domain connections using tools like Achieve the Core's Coherence Map, and connect mathematics to other disciplines such as science, social science, and career and technical education. These experiences strengthen the ability to design instruction that emphasizes real-world application and reflects the numeracy skills students will need as adults.²¹



Why It Matters

Section 1 emphasizes that numeracy develops through a cohesive continuum rather than isolated lessons. Instructional coherence reduces fragmentation in instruction, ensuring mathematics is experienced as connected and cumulative and promotes equitable access by removing systemic barriers to rigorous mathematics instruction. This includes establishing clear systems for early identification of students at risk for numeracy difficulties. Without clear systems for early identification and response, gaps widen and become more difficult to address over time.



Designing Coherent and Equitable Learning Systems

Teacher Actions

- ✓ Study vertical and horizontal alignment of standards and practices
- ✓ Design lessons and systems that provide multiple entry points and pathways, including scaffolds, targeted supports, and extensions, without removing students from grade-level content
- ✓ Analyze barriers to access in tasks and materials
- ✓ Plan for scaffolding and differentiation
- ✓ Collaborate across roles and departments
- ✓ Design and refine tasks to maintain rigor while increasing accessibility

Leadership Actions

- ✓ Ensure professional learning includes specialized learning strategies
- ✓ Audit systems for equitable access to grade-level mathematics
- ✓ Conduct audits of curriculum, instruction, and intervention systems for coherence
- ✓ Ensure structures for ongoing collaboration between educators and support staff
- ✓ Define and communicate grade-level benchmarks and align supports when students do not meet expectations
- ✓ Ensure systems are in place for inclusive access, including co-teaching, targeted intervention, and enrichment, so that all students engage in meaningful mathematics

Domain 4 in Practice:

- ✓ A math coach brings copies of student work from three classrooms to a vertical team meeting. The team uses a structured protocol to sort the work by what it reveals about student understanding, not by correctness, and identifies instructional next steps. Teachers leave with a clearer picture of how reasoning develops across grade levels, while leaders reinforce expectations that PLC time centers on analyzing student thinking.

Aligning Assessments, Standards, and Professional Expectations



Professional learning must anchor teacher growth in state and national standards. Teachers need explicit opportunities to align their instruction to the Illinois Learning Standards for Mathematics and Standards for Mathematical Practice. Preparation and in-service learning should also reflect national expectations, such as the Association of Mathematics Teacher Educators (AMTE) Standards.²² For secondary teachers, alignment includes building the capacity to connect instruction to assessments that measure college and career readiness.²³



Why It Matters

Section 1 emphasizes that assessment is only meaningful when it informs and changes instructional decision-making; its purpose is not simply to collect data but to guide what happens next in teaching and learning. When used effectively, assessment becomes an ongoing process that drives responsive instruction, shaping decisions about pacing, differentiation, intervention, and ensuring all students have access to meaningful mathematical learning.



Aligning Assessments, Standards, and Professional Expectations

Teacher Actions

- ✓ Design formative and summative assessments
- ✓ Use assessment data to inform instructional decisions
- ✓ Design student self-assessments and reflection tasks
- ✓ Study alignment between standards, SMPs, and Six Components of Numeracy
- ✓ Analyze assessment data with attention to student subgroups, identifying patterns in performance for MLs, students with disabilities, students with dyscalculia, and advanced learners to inform instruction

Leadership Actions

- ✓ Provide professional learning on analyzing student thinking through data
- ✓ Align district assessments to standards and instructional priorities
- ✓ Provide structures for regular data analysis and instructional adjustment
- ✓ Ensure assessment practices and data use include equity-focused analysis, leading to instructional decisions that support access, intervention, and extension for all learners

Domain 5 in Practice:

- ✓ An instructional coach meets monthly with the secondary math team to review assessment data against the Illinois Learning Standards for Mathematics. The team identifies which Standards for Mathematical Practice are evident in student work and which are missing, then adjusts tasks and instruction accordingly. This analysis drives the next professional learning cycle, supported by leadership through consistent expectations and time for data-informed collaboration.

School and District Leaders

To support student learning of numeracy and teachers' evidence-based mathematics instruction, school and district leaders must act as instructional leaders. It is not enough for leaders to understand general, subject-neutral principles of learning and instruction.

When leaders cultivate their own understanding of high-quality mathematics instruction, they create the conditions for teachers and students to thrive. Leaders should engage in mathematics professional learning alongside educators, not only to strengthen their knowledge of evidence-based instructional strategies but also to signal the value of collaborative learning at every level of a system.²⁴ Leaders can also deepen their understanding by engaging in classroom observations, or "math walks," with coaches and teacher leaders, using structured "look for" tools to focus on evidence of student reasoning, teacher questioning, and equitable participation.²⁵

Ambitious and equitable mathematics instruction requires leaders to:

- Develop a vision of high-quality numeracy in partnership with educational leaders, including teachers, community members, and students
- Promote instruction that aligns to the Illinois Learning Standards, the Standards for Mathematical Practice, and evidence-based practices
- Ensure that all teachers, regardless of content area or grade level, understand their role in building students' numeracy and actively promoting a shared, schoolwide commitment to numeracy development
- Engage in observation and feedback cycles that emphasize teacher growth, reflection, and analysis of student thinking outside and apart from formal evaluations²⁶
- Create and sustain collaborative structures, such as PLCs, vertical teams, and data teams, where teachers analyze student work, examine progressions, and plan instruction together²⁷
- Prioritize equity in professional learning, ensuring that teachers have access to resources, coaching, and collaborative time to meet the needs of all learners²⁸



Specific Learnings for Leaders

Leaders need explicit opportunities to learn how to recognize, support, and sustain ambitious and equitable numeracy instruction.

What To Look For in Classrooms	How to Provide Feedback	What Productive Collaborative Structures Look Like
a. Evidence of student reasoning, not just correct answers b. Use of multiple representations (manipulatives, visuals, symbols, and real-world contexts) and models c. Discourse structures that promote equitable participation d. Connections to developmental progressions of learning standards, the Standards for Mathematical Practice, and the Six Components of Numeracy e. Multiple sources of data such as student work samples, formative assessments, etc., used to drive instruction f. Use of evidence-based instructional routines that build reasoning, fluency, and connections	a. Use observation tools that are formative, non-evaluative, and tied to instructional practices b. Focus feedback on student learning evidence rather than teacher compliance c. Highlight strengths while identifying one to two specific, actionable areas for growth d. Engage in reflective dialogue, asking teachers to analyze student thinking and consider instructional moves	a. PLCs: Teachers gather to co-plan, analyze student work, and reflect on instruction using shared protocols. b. Vertical Teams: Educators across grade levels examine math content progressions to strengthen coherence in numeracy. c. Data Teams: Teachers use multiple data sources (summative and formative) to inform instruction, focusing on growth, not deficit. d. Leaders provide the time, resources, and facilitation to ensure these structures remain teacher-driven and student-centered and that professional learning is sustained, ongoing, and iterative.

In-Service Educators

Illinois educators need sustained professional learning across their careers to refine practice, deepen mathematical knowledge, and respond to the needs of students. In-service professional learning extends and strengthens the foundation established during educator preparation programs. Districts, schools, and Regional Offices of Education (ROEs) carry shared responsibility for ensuring that educators have equitable access to these opportunities.

In-service learning addresses areas that preparation programs cannot, such as long-term growth in mathematical knowledge for teaching, leadership development, equity-driven instructional design, and advanced assessment literacy. Effective systems recognize that professional growth develops across a career continuum and requires coherent structures that support collaboration, coaching, mentoring, and leadership opportunities.

Core Components

These components reflect the qualities of high-quality professional learning and describe the structures Illinois districts, schools, and ROEs can use to support ongoing teacher growth. Educator learning needs vary based on experience, content knowledge, role, and context. Effective professional learning systems must be intentionally designed and calibrated to reflect these differences. Administrators play a critical role in creating the structures, supports, and differentiated opportunities necessary to ensure all educators engage in meaningful, relevant professional learning that leads to improved instructional practice.

Time and resources are critical factors in the design and implementation of professional learning, and schools and districts vary in the level of access they have to each. Effective systems recognize these constraints and prioritize high-impact, sustainable approaches. Leaders can address limitations by embedding professional learning into existing structures such as PLCs, leveraging internal expertise through teacher leadership, utilizing regional supports (e.g., ROEs or Intermediate Service Centers [ISCs]), and focusing on job-embedded practices that connect directly to daily instruction. Thoughtful use of time and resources ensures that professional learning remains meaningful and actionable, regardless of context.

1. Institutes and Intensives

Districts and ROEs can provide summer institutes, intersession programs, or multi-day workshops that strengthen teacher understanding of mathematics content and pedagogy. Institutes must actively engage teachers as learners of mathematics, using the same tools and routines, such as problem strings, discourse structures, and modeling, that they will later implement with students.²⁹

2. Professional Learning Communities

Schools can structure Professional Learning Communities where teachers collaborate to analyze student work, unpack standards, and design coherent progressions of learning. High-functioning PLCs go beyond pacing and logistics; they include co-planning, co-teaching, peer observation, and structured reflection to build shared expertise.³⁰



3. Coaching and Specialists

Instructional coaching is a critical lever for changing practice. Math specialists and coaches provide modeling, co-planning, feedback, and cycles of observation. Coaches not only model effective strategies but also support teachers as they rehearse and refine these approaches in their own classrooms. Coaching must align to the Illinois Learning Standards and expectations for effective teaching.³¹

In contexts where dedicated math coaches are not available, schools can leverage alternative structures to provide similar support. This may include partnering with ROEs, ISCs, or professional organizations to access content expertise, as well as utilizing virtual coaching models, instructional networks, or shared service agreements across districts. Schools can also build internal capacity by identifying teacher leaders, facilitating peer observation and feedback cycles, and structuring PLCs to include modeling, rehearsal, and reflection.

4. Mentoring and Induction

Novice teachers require structured support that bridges preparation to independent practice. Induction programs should emphasize lesson design, numeracy-rich routines, and equity-focused practices. Mentors help new teachers build confidence in discourse practices, student reasoning routines, and analysis of misconceptions.³²

5. Online and Cross-District Networks

Virtual platforms extend access to teachers in rural or under-resourced districts. Online professional learning communities provide video-based lesson analysis, discussion forums, and statewide collaboration.³³ These networks allow teachers to share practice, reflect together, and build professional community.

6. Partnerships

Illinois Regional Offices of Education, higher education institutions, and mathematics-focused nonprofits and professional organizations can serve as key partners in this work. Districts are encouraged to develop local and regional partnerships aligned to their context and student population, collaborating with ROEs, universities, nonprofits, and professional associations to expand capacity, strengthen instructional expertise, and support leadership development. Effective partnerships are built through shared instructional goals, designated points of contact or committees, and ongoing communication and agreements focused on improving teaching and learning, including models such as lesson study and other collaborative improvement practices.

7. Sustained Engagement and Evaluation

Professional learning must spiral across time, not occur as isolated events. Teachers need multiple opportunities to revisit ideas, apply them in practice, and refine through cycles of feedback and reflection. Districts and ROEs should monitor participation, collect teacher input, and evaluate impact using classroom observations, reflections, and student outcomes.³⁴

Practice	When Appropriate	Alignment to Professional Standards	Less Impactful Practices
Lesson study cycles with co-planning, observation, and refinement ³⁵	When schools or districts want to build collective expertise through collaborative lesson design and reflection	Illinois Learning Standards for Mathematics; Standards for Mathematical Practice (SMP 1, SMP 3, SMP 6); Professional Standards for All Teachers, Standard 2: Content Area and Pedagogical Knowledge (23 Ill. Adm. Code 24.130(b)) [CP]	Teachers meet to discuss a lesson but do not observe or analyze student learning, leaving no actionable insights
Long-term coaching cycles that include modeling and reflection ³⁶	When districts aim to provide individualized, sustained support for teacher growth	Professional Standards for All Teachers, Standard 8: Collaborative Relationships (23 Ill. Adm. Code 24.130(h)); AMTE Standards (2017); Learning Forward Standards (2022)	A single coaching visit with generic feedback that does not include modeling, observation, or reflection
PLC protocols for analyzing student work and misconceptions ³⁷	During grade-level or department meetings where teachers collaboratively examine evidence of student thinking	Illinois Learning Standards for Mathematics; ILTS Framework performance indicators (Middle Grades 202, Secondary 208); 23 Ill. Adm. Code 26.200	PLCs that focus only on pacing guides or logistics without analyzing student reasoning or addressing misconceptions
Cross-district online communities with video libraries and discussion forums ³⁸	When educators in rural or under-resourced schools need access to professional learning networks beyond their district	Learning Forward Standards (2022); Professional Standards for All Teachers (23 Ill. Adm. Code 24.140)	Teachers access a video library but receive no structure for reflection, collaboration, or feedback



Practice	When Appropriate	Alignment to Professional Standards	Less Impactful Practices
Equity-centered workshops using culturally relevant contexts and UDL ³⁹	When schools and ROEs focus professional learning on serving multilingual learners, students with disabilities, and historically marginalized groups	CRTL Standards (23 Ill. Adm. Code 24.50); UDL Guidelines (CAST, 2018)	One-off workshops that cover equity in theory but do not connect to lesson design, practice, or student work
Mentoring structures that provide feedback on numeracy routines and discourse ⁴⁰	When districts design induction programs to support novice teachers in their first years	Professional Standards for All Teachers, Standard 8: Collaborative Relationships (23 Ill. Adm. Code 24.140); AMTE Standards (2017)	Assigning a mentor without structured time, focus on numeracy, or observation/feedback cycles

Figure 18: Examples of Evidence-Based Professional Learning Practices For In-Service Teachers

Teacher Preparation

Illinois educator preparation programs are responsible for preparing candidates with mathematical knowledge, instructional practices, and professional dispositions through coursework and field experiences that form the foundation of numeracy instruction. Teacher preparation must do more than teach candidates about mathematics; it must build their numeracy as learners. Pre-service educators need opportunities to strengthen their own reasoning, build confidence through identity-affirming practices, and experience mathematics in the same active ways they will later facilitate for their students.

Expected Outcomes at Program Completion

By the end of the program, educator preparation programs should ensure candidates are able to:

- Design and implement numeracy-rich instruction: Plan lessons that connect content to real-world and cross-disciplinary contexts, incorporate multiple representations, and select tasks that promote reasoning, problem solving, and discourse
- Elicit and extend student thinking: Use questioning strategies to surface reasoning, recognize developmental stages of numeracy, and analyze student work to address misconceptions⁴¹
- Build fluency through understanding: Facilitate number sense routines, math talks, fluency games, visual models, and intentional practice to develop foundational and derived addition and multiplication basic math facts to strengthen fluency grounded in reasoning⁴²
- Support equitable, inclusive numeracy development: Affirm all students as mathematical thinkers through culturally and linguistically responsive pedagogy
- Engage in reflective, standards-driven practice: Align lessons with the Illinois Learning Standards and SMPs, reflect on evidence of student learning, and collaborate with colleagues in PLCs

Coursework and Field Work Integration

Preparation programs provide a balanced structure that integrates mathematics content and pedagogical approaches practiced through fieldwork. High-quality preparation mirrors high-quality professional learning, which is content-rich, active, collaborative, and sustained. EPPs should align their curricula with the following Illinois standards and codes:

- Mathematics Standards for Elementary Teachers ([23 Ill. Adm. Code 20.120](#))
- Mathematics Standards for Mathematics Teachers in Middle Grades ([23 Ill. Adm. Code 21.150](#))
- Code of Ethics for Illinois Educators ([23 Ill. Adm. Code 22.20](#))
- Culturally Responsive Teaching and Leading Standards ([23 Ill. Adm. Code 24.50](#))

The following components reflect ISBE's guidance for high-quality educator preparation in mathematics. Programs are encouraged to review their coursework and field experiences against these components and identify areas for alignment and strengthening.

- Mathematics content courses: Content courses should emphasize reasoning, application, and connections among domains and grade bands. They model how adults use mathematics in authentic contexts and how children think about and learn these concepts.⁴³
- Mathematics methods courses: Methods courses emphasize active learning: Candidates engage in number talks, problem strings, and inquiry-based routines to experience mathematics as learners. Faculty model effective practices and provide opportunities for candidates to design lessons that elicit and extend student thinking.
- Foundational education courses: Programs connect development, psychology, curriculum, assessment, and diversity to numeracy. Research highlights the value of integrating content with foundational knowledge to strengthen instructional decisions.⁴⁴
- Fieldwork and integration: Candidates participate in a variety of fieldwork including but not limited to whole group, small group, one-on-one, and tutoring. Each setting should provide structured cycles of planning, teaching, feedback, and reflection.⁴⁵ Integrative experiences such as seminars and a final student teaching or equivalent experience require candidates to synthesize content, pedagogy, and equity practices into a coherent vision of numeracy instruction and demonstrate readiness for licensure.

Educator preparation programs should be organized to include mathematics content courses, mathematics methods/pedagogy courses, foundational education courses, and extensive opportunities to practice through fieldwork. Programs must align all coursework and fieldwork to the Illinois Learning Standards for Mathematics, SMPs, and Illinois endorsement requirements. Strong programs also include collaborations with local schools and actively work to recruit and support teacher candidates that reflect the diversity of Illinois' student population, thus strengthening the educator pipeline.



Practice	When Appropriate	Alignment to Professional Standards	Less Impactful Practices
Build fluency through reasoning strategies (i.e., number talks, math routines, math games, visual models, and problem strings in methods courses) ⁴⁶	During coursework that connects mathematical content to pedagogy, allow candidates to experience mathematics as learners	Illinois Learning Standards for Mathematics (SMP 2, SMP 3, SMP 4); AMTE Standards (2017)	Instructor lectures about number talks without engaging candidates in the routine or analysis of student thinking
Structured rehearsal cycles in clinical placements (plan–teach–reflect–revise) ⁴⁷	In clinical experience or coursework where candidates practice instructional moves and receive mentor feedback	23 Ill. Adm. Code 25 (b) (Clinical Experiences); Professional Standards for All Teachers, CRTL Standards (23 Ill. Adm. Code 24.50)	Candidate only observes or teaches a lesson once without feedback or opportunities to revise practice
Analysis protocols for student work aligned to Illinois Learning Standards ⁴⁸	When building assessment literacy and practicing instructional decision making based on real or sample student artifacts	Illinois Learning Standards for Mathematics; ILTS Frameworks (Middle Grades 202, Secondary 208); NCATE/CAEP Assessment Standards	Candidate reviews answer keys but does not analyze student misconceptions or reasoning
Case studies applying CRTL and UDL ⁴⁹	In foundations or methods courses where candidates design responses to common instructional challenges with equity at the center	Universal Design for Learning Guidelines (CAST, 2018); CRTL Standards (23 Ill. Adm. Code 24.50)	Candidate studies generic lesson plans with no consideration for multilingual learners, students with disabilities, or cultural responsiveness

Figure 19: Examples of Evidence-Based Professional Learning Practices in Teacher Preparation

Section Summary

This section establishes the conditions necessary to bring the instructional vision of the Illinois Comprehensive Numeracy Plan to life. High-quality professional learning is intentional, sustained, and aligned to evidence-based mathematics instruction, ensuring that educators build the knowledge, skills, and dispositions needed to support all learners across the professional learning continuum. By organizing professional learning around the five domains and embedding it within coherent systems, schools and districts can create meaningful opportunities for continuous growth from preparation through advanced practice and leadership. Leadership plays a critical role in designing and sustaining these systems, ensuring that professional learning is responsive, equitable, and directly connected to classroom practice. Together, these elements define how effective professional learning can be implemented and sustained to improve mathematics teaching and learning across Illinois.

Additional Resources

Section 2

These resources are recommended based on feedback and insights gathered through public engagement that demonstrate strong alignment to this section of the Numeracy Plan. They provide opportunities to explore the topics in greater depth and offer additional context to support the work. Their inclusion does not constitute an endorsement by ISBE.

Books

- *Building a Math-Positive Culture* by Cathy Seeley
- *Choosing to See: A Framework for Equity in the Math Classroom* by Kyndall Brown and Pamela Seda
- *Coaching the 5 Practices: Supporting Mathematics Teachers in Orchestrating Productive Discussions* by Bilge Yurekli, Margaret (Peg) Smith, and Mary Kay Stein
- *The Five Disciplines of PLC Leaders* by Timothy D. Kanold
- *Grading With Integrity: A Research-Based Approach Grounded in Honesty, Transparency, Accuracy, and Equity* by Douglas Fisher, Nancy Frey, and Thomas R. Guskey
- *The Illustrated Guide to Visible Learning: An Introduction to What Works Best In Schools* by John Hattie, Douglas Fisher, Nancy Frey, and John Almarode
- *The Instructional Playbook: The Missing Link for Translating Research into Practice* by Jim Knight, Ann Hoffman, Michelle Harris, and Sharon Thomas
- *Learning by Doing: A Handbook for Professional Learning Communities at Work* by Richard DuFour, Rebecca DuFour, Robert Eaker, Thomas W. Many, Mike Mattos, and Anthony Muhammad
- *Math Therapy: 5 Steps to Help Your Students Overcome Math Trauma and Build a Better Relationship With Math* by Vanessa Vakharia
- *Mathematics for Human Flourishing* by Francis Su
- *Mathematics Formative Assessment series* by Page D. Keeley and Cheryl Rose Tobey
- *Standards for Professional Learning* by Learning Forward

Podcasts

- *The Cult of Pedagogy* hosted by Jennifer Gonzalez
- *Educating All Learners Podcast* from Educating All Learners Alliance
- *The Grading Podcast* hosted by Sharona Krinsky and Robert Bosley
- *Instructional Coaching with Ms. B* hosted by Chrissy Beltran
- *Mathematics Teacher Educator Podcast* hosted by Joel Amidon

Additional Resources

Section 2

Tools

- [Achieve the Core](#)
- [Educating All Learners Alliance](#)
- [IES Practice Guides](#) and [Flyer](#)
- [Learning Forward](#)
- [Marzano Resources](#)
- [Math Observation Protocol](#)
- [Teaching Channel](#)
- [Video in the Middle](#)





Goal 2: Workbook

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.



Goal 2

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.

Implementation Considerations

- Professional learning should deepen mathematical content knowledge and instructional practice.
- Educators benefit from experiencing mathematics as learners through reasoning, discourse, and problem solving.
- Instructional practices should reflect evidence-based routines that support numeracy development.
- Professional learning should be ongoing, collaborative, and connected to classroom practice.
- Equity and accessibility should be embedded in all professional learning experiences.

Notes

Next Steps

Engage in professional learning focused on numeracy progressions and student thinking.

Apply instructional routines such as number talks, problem strings, and discourse structures.

Collaborate with colleagues to analyze student work and instructional impact.

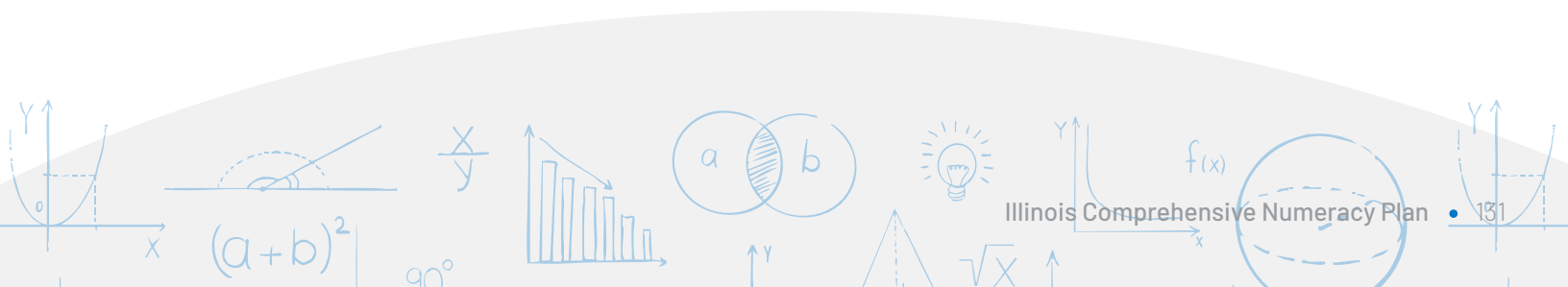
Reflect on how professional learning influences classroom practice.

Seek coaching or mentoring to refine instructional strategies.



Reflection Questions

1. How does professional learning strengthen my understanding of numeracy development?
2. Which instructional practices have the greatest impact on student reasoning?
3. How do I apply learning from PLCs or coaching into daily instruction?
4. What additional support would help me refine my numeracy instruction?
5. How does professional learning affirm my identity as a mathematics educator?



Goal 2

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.

Implementation Considerations

- Teacher leaders support sustained, job-embedded professional learning.
- Professional learning should be aligned to evidence-based numeracy instruction.
- Data and student work should guide collaborative learning.
- Coaching and mentoring are key levers for instructional improvement.
- Equity-focused practices must be reinforced through professional learning.

Notes

Next Steps

Facilitate PLCs focused on numeracy progressions and instructional coherence.

Support teachers in analyzing student thinking and misconceptions.

Model evidence-based instructional routines and strategies.

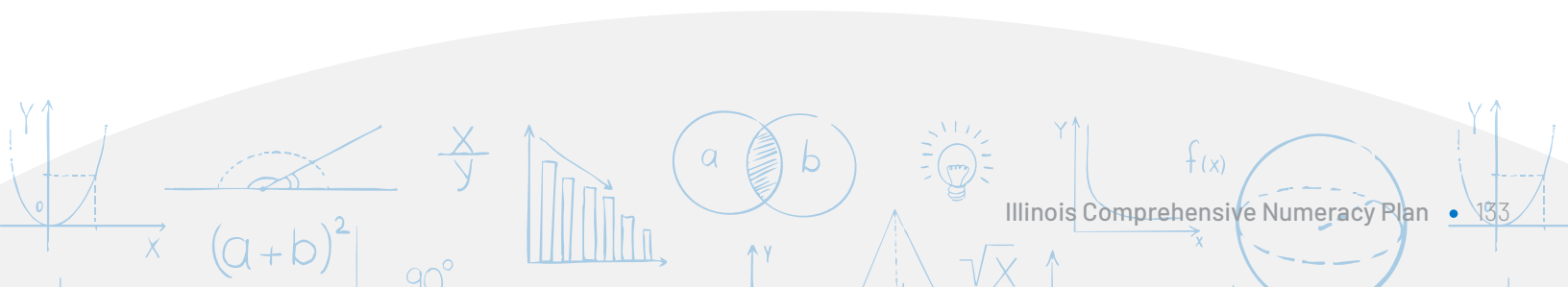
Use data to identify professional learning needs.

Collaborate with school leaders to align professional learning priorities.



Reflection Questions

1. How do current professional learning structures support numeracy instruction?
2. How do I help teachers connect professional learning to classroom practice?
3. What patterns emerge in student work across classrooms?
4. How do I support equitable participation in professional learning?
5. What barriers limit the effectiveness of professional learning?



Goal 2

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.

Implementation Considerations

- School leaders play a key role in sustaining high-quality professional learning.
- Professional learning should be aligned to schoolwide numeracy goals.
- Leaders should participate in professional learning alongside educators.
- Collaborative structures support instructional coherence and growth.
- Equity should guide decisions about access to professional learning.

Notes

Next Steps

Allocate time and resources for sustained numeracy-focused professional learning.

Engage in classroom observations and feedback cycles focused on student reasoning.

Support PLCs and coaching aligned to evidence-based practices.

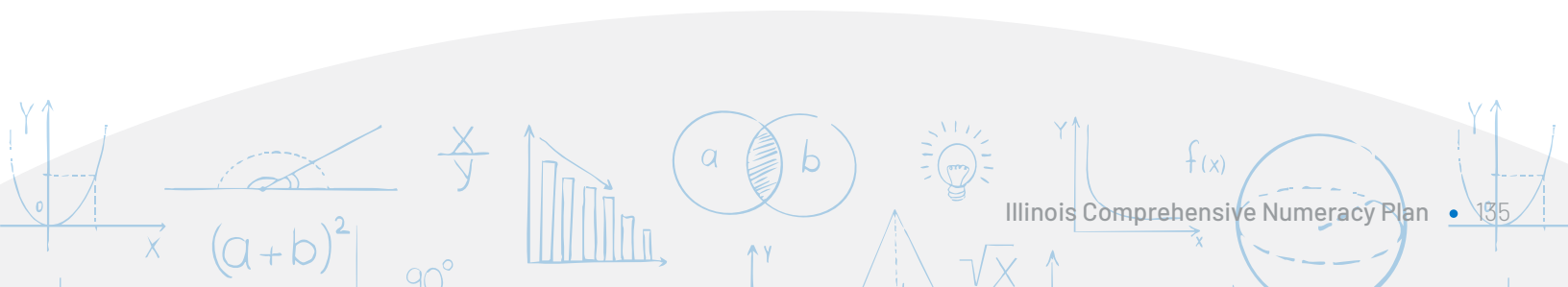
Use data to evaluate the impact of professional learning.

Promote a culture of reflection and continuous improvement.



Reflection Questions

1. How does professional learning support schoolwide numeracy goals?
2. Are educators receiving consistent, high-quality learning opportunities?
3. How do observation and feedback practices support instructional growth?
4. How is equity addressed in professional learning decisions?
5. What structures need strengthening to sustain learning over time?



Goal 2

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.

Implementation Considerations

- District systems should support professional learning across the educator continuum.
- Professional learning should be aligned to curriculum, assessment, and instruction.
- Job-embedded learning strengthens instructional coherence.
- Partnerships expand professional learning capacity.
- Equity should guide access and resource allocation.

Notes

Next Steps

Develop a districtwide numeracy professional learning plan.

Align professional learning with curriculum adoption and implementation.

Support coaching, mentoring, and leadership development.

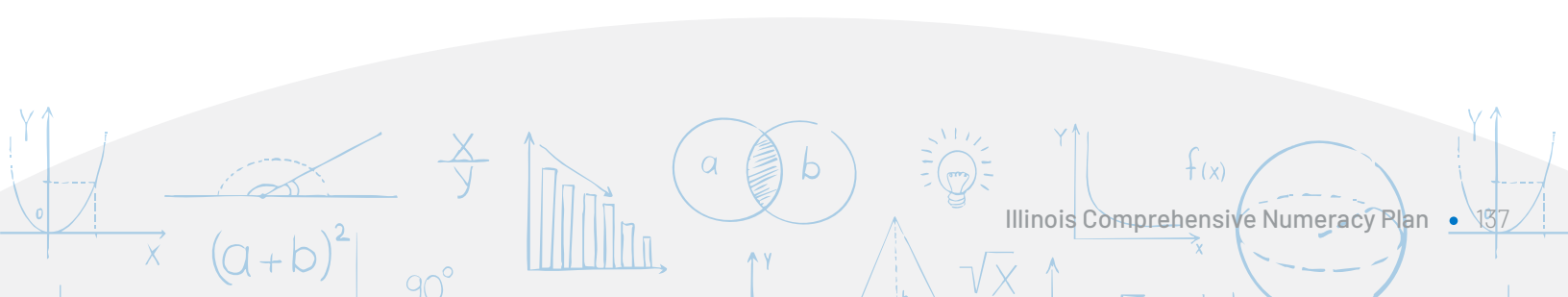
Monitor participation and impact using multiple data sources.

Address gaps in access to professional learning opportunities.



Reflection Questions

1. How coherent is professional learning across the district?
2. What data informs professional learning priorities?
3. How are leaders supported as instructional leaders in mathematics?
4. How do partnerships strengthen professional learning systems?
5. What inequities exist in access to professional learning?



Goal 2

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.

Implementation Considerations

- Regional leaders support districts through shared learning and collaboration.
- Professional learning should reflect regional needs and assets.
- Cross-district collaboration strengthens instructional capacity.
- Virtual learning expands access to professional learning.
- Equity should remain central to regional support efforts.

Notes

Next Steps

Conduct regional needs assessments related to numeracy instruction.

Provide professional learning aligned to evidence-based practices.

Facilitate cross-district PLCs and learning networks.

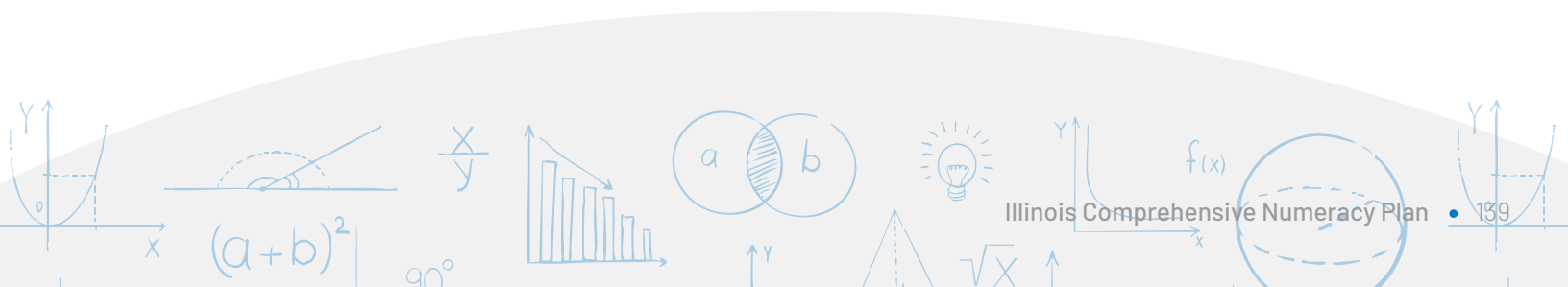
Support districts in evaluating professional learning impact.

Coordinate resources to support underserved districts.



Reflection Questions

1. How do regional offerings align with district numeracy needs?
2. What opportunities exist for cross-district collaboration?
3. How is equity addressed in regional professional learning?
4. How effective are virtual learning structures?
5. What additional supports are needed across the region?



Goal 2

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.

Implementation Considerations

- Preparation programs form the foundation of educators' numeracy knowledge.
- Coursework should integrate content, pedagogy, and equity.
- Candidates should experience evidence-based instructional practices.
- Fieldwork should reinforce numeracy-rich instruction.
- Alignment to state standards ensures coherence.

Notes

Next Steps

Align coursework with the ICNP definition of numeracy.

Apply instructional routines such as methods courses.

Provide structured field experiences with feedback cycles.

Strengthen candidate assessment literacy.

Collaborate with districts to align expectations.



Reflection Questions

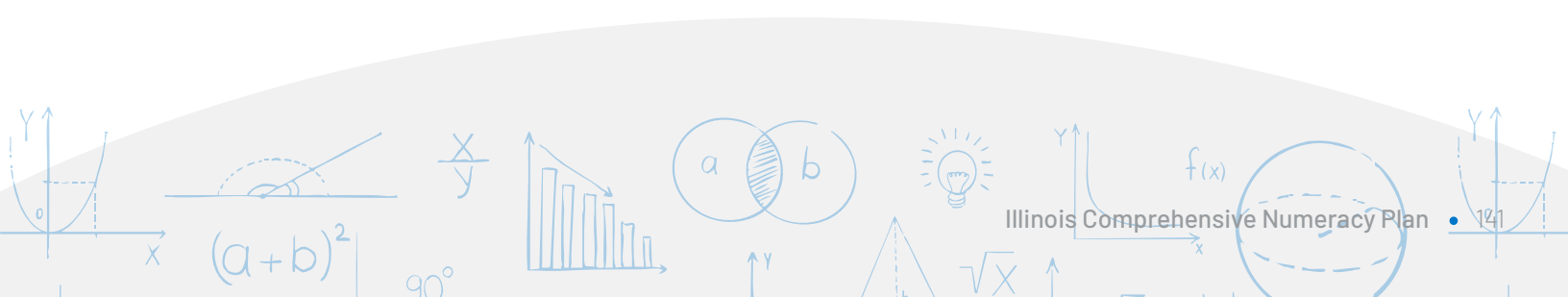
1. How do preparation programs build candidates' numeracy as learners?

2. How are candidates prepared to elicit and extend student thinking?

3. How do field experiences reflect high-quality mathematics instruction?

4. How is equity embedded in preparation experiences?

5. What gaps exist between preparation and classroom expectations?



Goal 2

Educators will use evidence-based numeracy instructional strategies to strengthen students' mathematical understanding and confidence.

Implementation Considerations

- State leadership shapes professional learning expectations and supports.
- Professional learning should align with statewide numeracy goals.
- Data should guide investment and improvement efforts.
- Cross-agency coordination strengthens impact.
- Equity should inform statewide professional learning strategies.

Notes

Next Steps

Provide statewide guidance and tools for numeracy professional learning.

Support access to high-quality professional learning across regions.

Monitor statewide participation and outcomes.

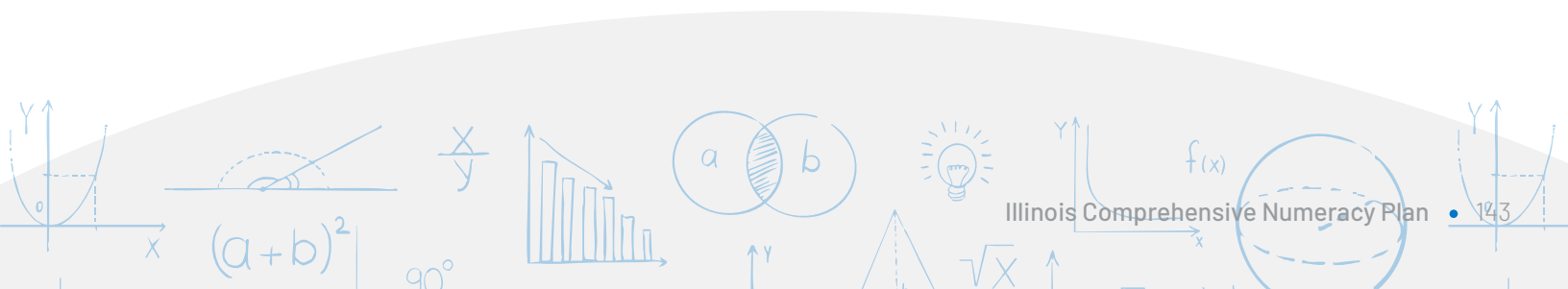
Align policy and funding to evidence-based practices.

Address systemic barriers to professional learning implementation.



Reflection Questions

1. How does statewide professional learning support numeracy goals?
2. What trends emerge in educator participation and impact?
3. How can policy better support sustained professional learning?
4. How is equity addressed across statewide efforts?
5. What conditions are needed to scale effective practices?



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