Mathematics Acceleration and Coherence Framework

TNTP

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The TNTP Mathematics Acceleration and Coherence Framework is a reflection and planning tool that examines whether students experience mathematics as a connected learning journey rather than a collection of disconnected programs. The framework builds on TNTP's broader work on academic opportunity and system design, including The Opportunity Myth, The Opportunity Makers, and Coherence by Design, which highlight the importance of providing students access to strong grade-level learning and ensuring the systems that support learning work together toward a common goal.

While high-quality instructional materials provide an essential foundation for mathematics instruction, students experience much more than curriculum alone. Their opportunities to learn are shaped both by the quality of curriculum, assessments, instructional supports, and professional learning, and by how those components work together throughout the school day. The Mathematics Acceleration and Coherence Framework helps district leaders, organizations that develop core curriculum and/or supplemental programs, professional learning providers, and partner organizations examine how the different parts of a mathematics system work together. It helps them determine whether those components collectively support grade-level mathematics or unintentionally create fragmented learning experiences for students. District teams can use the framework to examine their systems, while providers and partners can use it to evaluate how their products, services, and supports contribute to coherence across the broader mathematics ecosystem.

Ultimately, the framework asks: If we followed a student through every mathematics learning experience across the system, particularly a student whose learning requires coordination across multiple instructional settings, educators, or supports, what would they experience: a connected, challenging, and supportive learning journey, or a collection of disconnected parts?

How the Framework is Organized

The framework is organized into four domains.

Domain 1: System-Level Structures, Policies, and Conditions examines whether the district's vision, policies, schedules, staffing, assessment systems, professional learning, technology decisions, and implementation practices reinforce a shared mathematics experience.

Domain 2: Coherent Progressions and Sequencing examines whether mathematical ideas are built logically within and across lessons, units, grades, core instruction, supplemental instruction, and assessments.

Domain 3: Coherence of Language, Representations, and Instructional Routines examines whether students encounter mathematical language, models, routines, and expectations that are consistent enough to support transfer and precise enough to avoid creating future misconceptions.

Domain 4: Instructional Actionability examines whether educators can move from materials and student evidence to clear instructional decisions about what to teach next, who needs support, what support to provide, and how to monitor student learning.

Key Terms

Several terms are used consistently to describe the different components of a district mathematics system. The definitions below are provided to establish a shared understanding of those terms.

- **Core instruction** is the grade-level mathematics learning every student receives through universal instruction and is often associated with Tier 1 supports within a multi-tiered system. While students may receive different scaffolds, accommodations, language supports, assistive technology, or other access supports based on their needs, these supports are considered part of universal core instruction because they enable meaningful participation in the shared grade-level learning experience.

- **Supplemental instruction** refers to the additional instructional opportunities students receive beyond core instruction, including interventions, small-group instruction, high-dosage tutoring, specially designed instruction, additional instructional time, and other resources designed to extend, reinforce, accelerate, or respond to identified learning needs. Supplemental instruction often includes, but is not limited to, supports commonly associated with Tier 2 and Tier 3 instruction. Supplemental instruction increases instructional intensity beyond core instruction and is intended to reinforce, not replace, students' access to grade-level mathematics.

- **Assessments** include the tools, tasks, reports, student work, scoring practices, and evidence educators use to understand student learning and determine next instructional steps.

- **Professional learning** includes the structures that build educator and leader capacity, such as training, coaching, professional learning communities, collaboration time, walkthroughs, and feedback.

- **EdTech, digital, and AI tools** are technology-based resources used for teaching, practice, assessment, reporting, planning, instructional decision-making, and communication about student learning.

Students experience these components as part of a single mathematics journey, not as separate parts of a system. Decisions in one area often influence what happens in another. A question about assessment may reveal a professional learning need. A question about supplemental instruction may surface a system condition, and a question about technology may point back to the instructional vision. The framework helps teams examine how the instructional components students experience work together to shape mathematics learning. It can also help organizations that develop curriculum, assessments, technology, professional learning, and implementation supports evaluate whether their products strengthen or disrupt coherence across the student experience.

Domain 1: System-Level Structures, Policies, and Conditions

Description

A coherent mathematics system begins with a clear, shared vision for the mathematics experiences every student should have, including consistent access to high-quality, grade-level instruction. That vision should guide decisions across the system—from scheduling, pacing, assessment, supplemental instruction, professional learning, staffing, and instructional resources to the initiatives and routines districts choose to discontinue when they no longer support coherent instruction. The vision should also reflect and incorporate district, state, and federal policies and requirements so that they can be interpreted and implemented consistently across schools and student groups.

Why Domain 1 Matters

When system conditions reinforce one another, students are more likely to experience mathematics as a connected, challenging, and supportive learning journey. Educators receive clearer guidance for curriculum, instruction, intervention, assessment, and professional learning, making it easier to provide meaningful access to grade-level mathematics. These coherent conditions help district leaders use evidence to address implementation challenges, allocate resources strategically, and build shared responsibility for student learning while creating clearer conditions for external partners, instructional materials providers, and support organizations to align their work to district priorities and student needs.

Reflection Questions

To what extent do stakeholders across the system share a common understanding of the district's vision, priorities, non-negotiables, and key policy requirements so that students experience a consistent and coherent mathematics learning journey?

How well do district, state, and federal policy requirements, along with district schedules, staffing, assessments, professional learning, supplemental instruction, and technology decisions, reinforce that vision and support coherent student experiences?

How are decisions that affect mathematics made across departments, and where do silos, competing priorities, or unclear decision-making authority create fragmented experiences for students and educators?

To what extent do educators receive consistent instructional messages through coaching, professional learning, supervision, and other educator learning experiences?

Which policies, structures, expectations, or initiatives may be creating unintended barriers, competing priorities, or inconsistent experiences for educators and students?

What evidence suggests that students are experiencing the mathematics program as intended, and what initiatives, resources, programs, assessments, tools, or practices may be contributing to fragmentation and should be revised, streamlined, or phased out?

To what extent do our AI, digital, and EdTech tools operate as part of our mathematics strategy rather than as separate initiatives?

Domain 2: Coherent Progressions & Sequencing

Description

A coherent mathematics system preserves the integrity of mathematical progressions by ensuring that ideas, understandings, and habits of reasoning develop logically within and across lessons, units, grade levels, instructional settings, and supports. Rather than simply determining the order in which content is taught, coherence makes the underlying mathematical storyline visible so new learning builds on prior understanding and prepares students for what comes next. Core instruction, supplemental instruction, assessments, professional learning, and digital tools should reinforce this progression rather than introduce competing sequences or disconnected learning. Educators should provide just-in-time support that strengthens students' access to grade-level mathematics by connecting the prerequisite knowledge most essential for current learning.

Why Domain 2 Matters

Students develop mathematical understanding through connected learning experiences that build on prior knowledge and prepare them for future learning. When mathematical progressions are coherent across classrooms, supplemental instruction, assessments, and instructional resources, students are more likely to recognize relationships among mathematical ideas rather than experience mathematics as a collection of isolated topics or procedures. When progressions are fragmented, students may encounter unnecessary repetition, gaps, disconnected prerequisite work, or acceleration that interrupts learning.

Coherent progressions help educators understand how mathematical ideas develop across grades, identify the prerequisite knowledge most essential for current grade-level learning, and provide just-in-time support while maintaining access to grade-level mathematics. Shared progressions create common expectations across teachers, interventionists, specialists, coaches, and leaders, enabling the system to support students through a common mathematical storyline.

Reflection Questions

To what extent does the mathematical storyline help students develop durable understandings, mathematical reasoning, and habits of thinking that support future learning across increasingly complex mathematics?

To what extent do students experience a coherent progression of mathematical ideas across core instruction, supplemental instruction, assessments, and digital tools?

How well do educators understand the mathematical storyline across grades, including why content is sequenced as it is and which prerequisite understandings matter most for current grade-level learning?

What evidence suggests that students receiving supplemental instruction remain connected to and successful with current grade-level mathematics rather than experiencing a separate learning pathway?

How clearly has the intended instructional purpose of supplemental instruction, interventions, and other supports been defined, and where do those supports strengthen coherent mathematical progressions versus create interruptions, redundancies, or fragmentation for students?

To what extent do core instruction, supplemental instruction, assessments, and technology reinforce the intended progression of mathematical learning, and where do students experience gaps, redundancies, or interruptions across those settings?

To what extent do students experience a common mathematical storyline and shared learning priorities across core instruction, supplemental instruction, assessments, and technology, and how well does professional learning support that coherence?

How well do AI and digital tools reinforce the mathematical progressions and rigor established in core instruction, and what evidence suggests they are strengthening rather than disrupting students' access to grade-level mathematics?

Domain 3: Coherence of Language, Representations, and Instructional Routines

Description

A coherent mathematics system helps students experience consistent mathematical language, representations, and instructional routines across core instruction, supplemental instruction and other supports, assessments, and digital tools, creating shared opportunities for mathematical thinking, reasoning, and communication. Instructional routines, such as Three Reads, create predictable opportunities for students to reason, communicate, and make sense of mathematics while developing lasting habits for learning. Across settings, students should encounter precise language, coherent representations (e.g., concrete, semi-concrete, and abstract), and consistent opportunities to explain their thinking.

Why Domain 3 Matters

When students experience consistent language, representations, and instructional routines, they can focus their cognitive effort on understanding mathematics rather than adjusting to competing terminology, representations, or expectations. Consistency and precision are particularly important for multilingual learners, students with language-based disabilities, and any student learning mathematics across multiple instructional settings.

Coherent language, representations, and routines help educators create a more predictable and connected learning experience for students. They strengthen collaboration across classrooms and instructional settings, support clearer communication about student thinking, and reduce the likelihood that instructional approaches inadvertently create misconceptions that interfere with future learning.

Reflection Questions

To what extent do students encounter consistent mathematical language, representations, routines, problem-solving approaches, and expectations across all instructional settings?

Where do students experience competing methods, language, representations, strategies, or expectations, and what impact might those differences have on learning?

How well are curriculum, assessments, supplemental instruction, professional learning, and technology aligned around a shared instructional approach?

If we followed a student across every mathematics learning setting during the day, to what extent would they experience a coherent approach to mathematical thinking, reasoning, communication, language, and representations?

How well do our language, representations, strategies, and instructional routines support understanding while avoiding misconceptions that may interfere with future learning?

How well do AI and digital tools reinforce the mathematical language, representations, strategies, and routines established in instruction, and what evidence suggests they are strengthening rather than disrupting coherence for students across learning settings?

Domain 4: Instructional Actionability

Description

A coherent mathematics system helps educators translate instructional materials and student evidence into clear, actionable decisions that support students' access to and success with grade-level mathematics. Actionability means educators can determine what to do next, why, and how that decision supports grade-level learning. Assessment tools, reports, instructional materials, and supplemental instruction should work together so educators can identify who needs support, what support to provide, how to monitor progress, and when students are ready for less intensive support. When instructional guidance and evidence are actionable, educators can make timely decisions that keep students engaged in grade-level mathematics rather than relying on disconnected systems or individual interpretations.

Why Domain 4 Matters

Students are more likely to remain engaged in meaningful grade-level mathematics when educators can respond quickly and effectively to evidence of learning. When instructional guidance, assessment information, and supports are clear, timely, and connected, students receive the right support at the right time while maintaining access to grade-level learning. When evidence is unclear or systems are difficult to navigate, instructional responses may be delayed, inconsistent, or disconnected.

Instructional actionability enables teachers, interventionists, specialists, coaches, and leaders to turn evidence into coordinated action. It supports informed instructional decisions, strategic resource allocation, ongoing student progress monitoring, and evaluation of whether supplemental instruction and other supports are producing the intended impact. In doing so, it helps make effective instructional responses more consistent across schools and student groups. Coherent instructional systems are further strengthened when curriculum providers, assessment developers, technology partners, and professional learning organizations design products and supports that make effective instructional responses clearer, easier, and more consistent for educators.

Reflection Questions

How effectively do core instruction, supplemental instruction, assessments, and technology work together to help educators determine what to do next for students, why that action is needed, and how it supports grade-level learning?

How consistently do students receive timely and appropriate instructional responses when evidence indicates they need additional support, challenge, or intervention?

How well do educators have access to the information, resources, and supports needed to make coordinated instructional decisions for students?

How consistently do teachers, interventionists, specialists, coaches, and leaders interpret the same student evidence and arrive at similar instructional responses?

Where do disconnected systems, unclear guidance, competing processes, or organizational structures create barriers to effective instructional decision-making?

What evidence suggests that students receive targeted support for prerequisite understandings, misconceptions, or unfinished learning while continuing to participate in and make progress with grade-level mathematics?

How well do AI and digital tools translate evidence of student learning into clear instructional actions, and what evidence suggests they are strengthening rather than disrupting timely, coordinated support for students?

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Appendix

How School Districts Can Use the Framework

The recommendations below are written primarily for district teams, but many can be adapted by curriculum providers, professional learning organizations, technology partners, state agencies, and other organizations seeking to strengthen coherence in the mathematics experiences students encounter across instructional settings, supports, and learning opportunities. Regardless of audience, the framework is intended to support reflection, learning, and continuous improvement.

Use this framework as a tool for shared inquiry, not as a one-time rating exercise. Coherence is not a destination. Priorities shift, staffing changes, new instructional resources and technologies are adopted, assessments are revised, and student needs evolve. Teams should return to the framework during key planning and improvement cycles, such as annual planning, the start or end of a school year, the adoption of new instructional resources, or when reviewing evidence related to curriculum implementation, assessment, intervention, or student outcomes. Repeated use can help identify where the system is becoming more connected, where fragmentation is emerging, and what actions may strengthen students' mathematics experiences over time.

Particular attention should be given to the experiences of students whose learning depends on coordination across multiple instructional settings, educators, and supports. These students often provide the clearest view of where the system works together well and where fragmentation remains. They are also among the students who have the most to gain from coherent systems, as coordinated support can accelerate learning while maintaining access to grade-level mathematics. Their experiences can reveal how well core instruction, supplemental instruction, assessments, professional learning, technology, and system conditions work together to support meaningful access to grade-level mathematics. Because all students move across multiple parts of the system, understanding where coherence breaks down for these students can help districts strengthen learning experiences for everyone.

Recommended Approach

- **Begin by assembling a cross-functional team.** The framework is designed to be used collaboratively rather than by a single department or individual, since students' mathematics experiences are shaped by decisions made across many parts of the system. At minimum, include leaders who understand mathematics curriculum and instruction, special education, multilingual learner services, assessment, intervention, school supervision, professional learning, technology, and operations. Include school leaders, coaches, interventionists, teachers, or other educators when their perspective is needed to understand the student experience.

- **Gather evidence.** Before answering the reflection questions, gather evidence rather than relying only on perceptions or written policy. Useful evidence may include curriculum maps, unit plans, pacing guidance, supplemental instruction schedules, assessment calendars and reports, student work, data meeting protocols, professional learning plans, walkthrough tools, coaching guidance, digital tool usage reports, technology approval processes, staffing models, schedules, and school-facing communications.

- **Conduct a landscape analysis.** Review the materials, tools, assessments, routines, and supports that are being used across core instruction, supplemental instruction, specialized services, and digital learning spaces. This analysis should include EdTech, digital, and AI tools, examining not only whether they are being used, but how and why they are being used. It should also consider whether they duplicate capabilities already embedded within existing resources or systems and whether they align with district priorities, instructional expectations, and grade-level learning goals. Further, the analysis should examine whether these tools reinforce alignment across core instruction, assessment, supplemental instruction, and instructional practice.

- **Review collected evidence and ask in-depth questions.** Teams should look for both alignment and tension. A “yes” answer is rarely enough. Ask: To what extent is this true? For whom? In which schools or grade levels? What evidence supports our answer? Where does practice differ from policy? Where do educators receive conflicting messages? Where are students being pulled away from grade-level mathematics when targeted support connected to current learning would better serve them?

  Treat disagreement as useful evidence. When discussing common terms such as fluency, explicit instruction, intervention, or screener, ensure the team has a shared understanding of what those terms mean in practice. Similar language can sometimes mask important differences in beliefs, expectations, or implementation that contribute to fragmentation across the system.

  Different views about how students learn mathematics, what counts as grade-level access, how assessment evidence should be used, or how digital tools should support instruction already affect students whether or not they are named. Surfacing those tensions creates an opportunity to build stronger coherence and clearer guidance for educators.

- **Apply the framework**. Teams can apply the framework in a variety of ways depending on a district’s local context. To examine system conditions, begin with Domain 1. Alternatively, it may make more sense to start with a pressing problem of practice, such as inconsistent supplemental instruction, pacing challenges, unclear digital tool guidance, or uneven instructional routines. Other districts may choose to follow one student pathway across core instruction, supplemental instruction, and assessment.

- **Determine next steps based on learning from the framework**. After each use, identify a small number of actions that will reduce fragmentation. These may include clarifying expectations, aligning professional learning, revising assessment guidance, adjusting schedules, strengthening collaboration structures, improving access to instructional resources, or de-implementing programs, tools, routines, or habits that no longer advance the instructional vision. The goal is to make the coherent choice easier for educators.

- **Iterate and continue learning**. Return to the framework after collecting additional evidence, implementing changes, or reaching key planning moments. These can include curriculum review, assessment review, intervention design, professional learning planning, or technology adoption. Repeated use should help the district see whether students’ mathematics experiences are becoming more connected and whether educators are receiving clearer, more consistent support.

About TNTP

TNTP is the leading research, policy, and practice organization dedicated to transforming America's public education system to meet the needs and expectations of tomorrow—for students, families, communities, and the nation. We are educators, researchers, innovators, and futurists committed to the belief that every student deserves access to a quality education and formative experiences that lead to a lifetime of economic and social mobility, regardless of zip code, race, class, primary language, or learning style.