

Developing a Standards-Aligned Math Skill Map

Many states have developed standards that raise expectations for what students should learn in math. But across the country, large numbers of students are still not reaching those expectations, and educators often lack the tools to understand why.

The problem is not the standards themselves. It is the absence of a clear, shared picture of how students build the knowledge required to meet them.

A standards-aligned math **skill map** fills this gap. It translates state standards into a coherent progression of skills, giving educators the visibility and precision needed to help every student stay on track to mastery.

Just as standards define *what* students should learn, a skill map defines *how learning builds*—and without it, states lack a critical piece of instructional infrastructure.

What is a Skill Map?

A math skill map translates state standards into a coherent, multi-year progression of learning. A skill map:

- Breaks broad standards into discrete, teachable skills that can be taught and assessed in a single lesson
- Identifies prerequisite relationships between skills across grade levels
- Shows how learning builds from foundational concepts to advanced applications

The result is a clear, connected view of how mathematical understanding develops over time.

What is a skill?

We define a math skill as procedural, conceptual, or applied learning that can be taught and assessed in a single 45-minute class period.

Why Standards Alone Are Not Enough

State standards are essential. They define what students should know and be able to do. But they are not designed to answer a critical instructional question: *what does this student need next?* Two limitations matter most for instruction:

1 Standards do not specify prerequisite knowledge.

Standards are written at the grade level in which content is taught, but do not specify the foundational skills students need to succeed. When students fall behind—or are ready to accelerate ahead—educators must make instructional choices without a clear roadmap. While some states have standards progression documents, they are not actionable for instructional choices and intervention.

2 Standards often bundle multiple skills.

Many standards combine several distinct skills in a single statement. This can mask partial understanding. Teachers cannot easily see which components a student has mastered and which are holding them back. This also means that some standards are substantially more complex than others, depending on the number of skills included. When students are introduced to an extremely complex standard for which they're not prepared, it can increase student frustration and ultimately decrease motivation.



What a Skill Map Enables

A standards-aligned skill map makes learning visible and actionable.

By breaking standards into discrete skills and mapping their dependencies, a skill map enables educators to:

- Identify the specific prerequisites blocking a student's progress
- Understand how grade-level content connects to prior and future learning
- Design targeted supports that address root causes rather than symptoms

Consider an 8th-grade student struggling with the Pythagorean theorem. A skill map would reveal that success may depend not only on current-grade content (e.g. exponents), but also on earlier skills such as solving equations or evaluating expressions. Instead of reteaching an entire unit, educators can target the specific missing skills.

This level of precision is especially critical as states work to address unfinished learning and ensure all students can access rigorous, grade-level instruction.



Why States Should Invest in a Skill Map

A state-specific skill map ensures full alignment to current standards, assessments, and instructional vision. Developing or adopting a state-aligned skill map creates shared instructional infrastructure that supports multiple state priorities:



Stronger Core Instruction

Teachers can anticipate and address student predecessor needs without lowering expectations.



More Effective Intervention

Interventions can be targeted to the specific skills students are missing, rather than broad reteaching of entire units or courses.



High-Quality, Aligned Assessments

States can develop or endorse assessment items tied to individual skills, enabling more precise diagnosis and progress monitoring.



Coherent Instructional Materials and PD

Curriculum selection, professional learning, and coaching can be anchored in a shared understanding of skill-level proficiency and learning progressions.



Portability and Credentialing of Learning

Skill-level mastery can be recognized across contexts—core instruction, tutoring, summer learning, or at-home practice—supporting more flexible and personalized pathways.



System-Level Visibility

States and districts can better understand where students are in their learning trajectories, enabling more strategic allocation of resources and supports.



How is a Skill Map Developed?

Developing a strong skill map begins with a clear understanding of the academic vision of the state or district, including the role of core instruction, intervention, acceleration, and assessment within the broader math strategy.

From there, the work typically includes:



Reviewing standards and expectations

The process begins with a systematic review of state standards, district expectations, achievement indicators, and, where relevant, core curriculum materials. This helps define the concepts, skills, and progressions that matter most.



Translating standards into teachable, assessable skills

Broad standards are broken into discrete skills that can be taught, observed, and assessed more precisely. This creates the level of clarity needed for meaningful instructional use.



Defining skill relationships

Each skill is connected to its foundational predecessor skills and to the more advanced skills it supports. This makes it possible to understand not just what students are expected to learn, but how that learning develops over time.



Refining the map collaboratively

Drafts are typically reviewed and refined with input from academic leaders, educators, and content experts to ensure the map reflects the standards, instructional philosophy, and priorities of the system.

Connecting the Investments

A standards-aligned skill map is not an add-on to existing state efforts. It is foundational infrastructure that enables those efforts to succeed.

States have already invested in defining rigorous expectations, improving curriculum, and strengthening assessments. A skill map connects these elements, ensuring that educators have a shared, precise understanding of how students build the knowledge required to meet those expectations.

Without this layer, student predecessor needs remain difficult to diagnose and address at scale. With it, states can provide educators with the clarity and tools needed to support every student in reaching mastery.

For states seeking to accelerate learning, improve outcomes, and ensure that all students can access and succeed in rigorous mathematics, developing a standards-aligned skill map is a critical next step.

