New Mexico Instructional Scope for Supporting Equitable and Culturally Responsive Mathematics Instruction

Overview

This Instructional Scope for Mathematics 3.0 was created by a cohort of New Mexico educators and the New Mexico Public Education Department.

The intention of this document is to act as a companion during the planning process alongside High Quality Instructional Materials (HQIM). A sample template is provided to show a snapshot of planning supports provided within each cluster of standards in the mathematics instructional scope.

During the creation of this document, we leveraged the work of other states, organizations, and educators from across the country and world. This work would not have been possible without all that came before it, and we wish to express our sincerest gratitude for everyone that contributed to the resources listed within our references.

To better understand the planning support provided in the mathematics instruction scope, this section provides a brief description of each planning support. This includes *what* support is provided, *why* the planning support is critical for equitable and culturally responsive mathematics instruction, and *how* to use the planning support with HQIM.

Cluster Statement

What: The New Mexico Mathematics Standards are grouped by domains, with somewhere between 4 to 10 domains per grade level. Within each domain, the standards are arranged into clusters. Cluster statements summarize groups of related standards.

Why: The New Mexico Mathematics Standards require a stronger focus on the way time and energy are spent in mathematics classrooms. Students should spend the majority of their time (65-85%) working on content within the major clusters of the grade/course. Supporting clusters and–where appropriate–additional clusters should only comprise 15-35% of the time spent in classes and be covered when they are connected to and engage students in the major work of the grade/course.

How: When planning with your HQIM, consider the time being devoted to major clusters versus additional or supporting clusters. The major work of each grade/course should be designed to provide students with strong foundations for future mathematical work, which will require more time than additional or supporting clusters. Also consider the ways your HQIM makes these connections between major clusters and additional and supporting clusters explicit for students.

Standard Text

What: Each cluster-level support document contains the text of each standard within that cluster.

Why: The cluster statement and standards are meant to be read together to understand the structure of the standards. By grouping the standards within the cluster, the connectedness of the standards is reinforced.

How: The text of the standards should ground all planning with your HQIM. Reading the standards within a cluster intentionally enables us to focus on the connections within and between the standards.

Standards for Mathematical Practice

What: The Standards for Mathematical Practice describe the expertise and habits of mind that mathematics educators at all levels should develop in their students.

Why: Equitable and excellent mathematics instruction supports students in becoming confident and competent mathematicians. By engaging with the Standards for Mathematical Practice, students engage in the practice of doing mathematics and developing mathematical habits of mind. These include the ability to think mathematically, analyze situations, understand relationships, and adapt what they know to solve a wide range of problems, including problems that do not look like any they have encountered before.

How: When planning with HQIM, it is critical to consider the connections between the content standards and the Standards for Mathematical Practice. The planning supports highlight a few practices students can engage in when learning the content of the standard. It is not necessary, or even appropriate, to engage in all of the practices every day. Instead, teachers should choose which Standards for Mathematical Practice to focus on within a given lesson, depending on the content standards being covered and the activities students will be engaging with. When teachers spend time intentionally supporting students in learning both the what (content standards) and the how (Standards for Mathematical Practice), students will have a stronger foundation of mathematical learning.

Clarification Statement

What: The clarification statement provides greater clarity for teachers in understanding the purpose of the standard.

Why: The New Mexico Mathematics Standards illustrate how progressions support student learning within each major domain of mathematics. The clarification statement provides additional context about the ways each cluster of standards supports student learning of the larger learning progression.

How: When planning with HQIM, use the clarification statement to support your understanding of how the materials use specific types of representations or change the learning sequence.

Demonstration Statements, Webb's Depth of Knowledge, Bloom's Taxonomy, and Aspect of Rigor

What: The New Mexico Mathematics Standards include one, two, or all three of the aspects of mathematical rigor: conceptual understanding, procedural skill and fluency, and application to the real world. These planning supports considers which aspect(s) of rigor are within each standard and then identifies academic skills students need to demonstrate comprehension of the standard and associated mathematical practices. The planning supports also provide information about two common classifications on cognitive complexity, Webb's Depth of Knowledge and Bloom's Taxonomy.

Why: Analyzing standards alongside the standards for mathematical practice provide a fuller picture of the mathematical competencies demanded in the standard.

How: When planning for a cluster of standards with your HQIM, a critical first step is to analyze the content and language demands of the standards and the associated Standards for Mathematical Practice. This analysis can be used to plan/design appropriate formative assessment, as well as interpret student data from formative assessments. The planning supports provide a breakdown of the standard that can serve as the basis for this sort of analysis.

Definitions of the Components of Rigor

Rigorous teaching in mathematics does not simply mean increasing the difficulty or complexity of practice problems. Incorporating rigor into classroom instruction and student learning means exploring at a greater depth, the standards and ideas with which students are grappling. There are **three** components of rigor that will be expanded upon in this document, and each is equally important to student mastery: **Conceptual Understanding, Procedural Skill and Fluency,** and **Application**.

- **Conceptual Understanding** refers to understanding mathematical concepts, operations, and relations. It is more than knowing isolated facts and methods. Students should be able to make sense of why a mathematical idea is important and the kinds of contexts in which it is useful. It also allows students to connect prior knowledge to new ideas and concepts.
- **Procedural Skill and Fluency** is the ability to apply procedures accurately, efficiently, and flexibly. It requires speed and accuracy in calculation while giving students opportunities to practice basic skills. Students' ability to solve more complex application tasks is dependent on procedural skill and fluency.
- **Application** provides valuable context for learning and the opportunity to solve problems in a relevant and a meaningful way. It is through real-world application that students learn to select an efficient method to find a solution, determine whether the solution makes sense by reasoning, and develop critical thinking skills.

A Special Note on Procedural Skill and Fluency

While speed is a component of fluency, it is not necessarily speed in producing an answer; rather, fluency can be observed by watching the speed with which a student engages with a particular problem. Furthermore, fluency does not require the most efficient strategy. The standards specify grade-level appropriate strategies or types of strategies with which students should demonstrate fluency (e.g., 1.OA.C.6 allows for students to use counting on, making ten, creating equivalent but easier or known sums, etc.). It should also be noted that teachers should expect some procedures to take longer than others (e.g., fluency with the standard algorithm for division, 6.NS.B.2, as compared to fluently adding and subtracting within 10, 1.OA.C.6).

Standards identified as targeting procedural skill and fluency do not all have an expectation of automaticity and/or rote recall. Only two standards, 2.OA.B.2 and 3.OA.C.7, have explicit expectations of students knowing facts from memory. Other standards targeting procedural skill and fluency do not require students to reach automaticity. For example, in 4.G.A.2, students do not need to reach automaticity in classifying two-dimensional figures.

*Adapted from Louisiana Department of Education

Assessment Items

What: Formative assessment is the planned, ongoing process used by teachers during learning and teaching to assess student learning in order to improve student understanding and support students in their learning. This planning support provides one or more sample items to assist teachers in their planning of formative assessments for each standard. These are intended to be used as a guide for what students should be able to complete and can be used alongside assessments provided within your HQIM. A link to additional assessment items from Illustrative Mathematics is also provided with each standard.

Why: When student thinking is made visible, the teacher can examine the progression of learning towards the goals of the standards and adjust instruction as necessary. By including students in the assessment and analysis process, teachers allow them to become strategic and goal-directed with their learning.

How: The sample items address the aspect(s) of rigor that aligns with each standard. This example can be used to discuss possible responses by students and next steps for instruction. A similar process can then be used to identify additional items from the formative assessment resources provided by your HQIM.

For additional information, see Standards Aligned Instructionally Embedded Formative Assessment Resources.

Common Misconceptions

What: This planning support identifies some of the common misconceptions students might have when engaging in learning about each mathematical topic.

Why: Students might have misconceptions based on an overgeneralization of patterns they notice or overly relying on rules rather than understanding the underlying concepts. Tips and tricks in mathematics expire over time as students move up through the grade levels. It is critical to understand some of the common misconceptions students can develop so we can address them directly with students and continue to build a strong foundation for their mathematical learning.

How: When planning with your HQIM, look for ways to directly address common misconceptions students have. This planning support provides some of the possible misconceptions, and your HQIM might include additional ones. The goal is not to avoid misconceptions–they are a natural part of the learning process. But we do want to support students in exploring their misconceptions and modifying incorrect or partial understanding.

Planning for Multi-Layered System of Support & Universal Design for Learning

What: The section on planning for Multi-Layered Systems of Supports (MLSS) and Universal Design for Learning (UDL) is designed to support teachers in planning for the needs of all students. Each section includes the three pillars of UDL, as well as options for pre-teaching and re-teaching. Some students might benefit from targeted pre-teaching and re-teaching supports, which improve students' acquisition of the knowledge and skills identified in the New Mexico Mathematics Standards. Intensive pre-teaching and re-teaching supports may also be helpful for smaller groups of students with more intensive needs. Progress monitoring should occur to assess students' responses to these additional supports.

Why: MLSS is a holistic framework that guides educators to intervene quickly when students need additional supports. The framework moves away from the "wait to fail" model and empowers teachers to use their professional judgment to make data-informed decisions regarding the students in their classrooms to ensure academic success with the grade-level expectations of the New Mexico Mathematics Standards.

How: When planning with your HQIM, use the suggestions for pre-teaching as a starting point to determine if some or all of the students in your classroom need targeted or intensive pre-teaching at the start of a unit to ensure they can access the grade-level material within the unit. The core instruction (which is grounded in the UDL Framework) and re-teach sections work together to support planning within a unit, looking for ways the materials support greater access for all students and provide options to revisit concepts based on formative assessment data. Additional information about MLSS can be found on the PED's website, and guidance and tools can be found here.

Vertical Alignment

What: The New Mexico Mathematics Standards are designed around coherent progressions of learning. Learning is carefully connected across grades so that students can build new understanding onto foundations built in previous years. Each standard is not a new event, but rather an extension of previous learning. The connections to previous, current, and future learning make this coherence visible. A link to Achieve the Core's grade-level coherence maps is provided with each standard.

Why: Students build stronger foundations for learning when they see mathematics as an interconnected discipline of relationships rather than discrete skills and knowledge that are only applicable in current situations. The intentional inclusion of connections to previous, current, and future learning can support a more interconnected understanding of mathematics.

How: When planning with HQIM, use the vertical alignment supports to find ways to help students make explicit connections within their study of mathematics.

Culturally and Linguistically Responsive Instruction

What: Culturally and Linguistically Responsive Instruction (CLRI) requires educators to contribute to a positive school climate by validating and affirming students' home languages and cultures, building and bridging mathematics to previous learning (both formal and informal), and using linguistic vocabulary supports. These actions legitimize students' home culture and language, making it clear that students' culture and language are positive assets in the classroom. It is also an intentional effort to reverse negative stereotypes of non-dominant cultures and languages and must be purposeful, consistent, and authentic, as well as both proactive and reactive. By building and bridging, students learn to toggle between the behaviors and expectations of home and those of school. By focusing on creating connections between the culture and language expectations of home and the expectations at school, we help students be set up for success in school. Linguistic supports are important within this structure as well, and help students learn new, academic vocabulary in ways that allow students to bring in their prior knowledge and connect it to new experiences. Linguistic supports for helping students acquire new academic vocabulary are provided from Pathways2Careers.

Why: The mathematical identities of students are shaped by the messages they receive about their ability to do mathematics and the power of mathematics in their lives outside of school. Educators must intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages. In addition, creating connections between the cultural and linguistic behaviors of students' home culture and language supports students in creating identities as capable mathematicians within school and society.

How: When planning instruction, it is critical to consider ways to validate/affirm and build/bridge students' cultural and linguistic assets. The planning supports for each cluster provide information

and examples of how to engage with equity-based teaching practices. There may be additional support available in your HQIM to ensure all students develop strong mathematical identities.

Student Discourse Guide

What: This guide provides educators with suggested questions to engage students in discourse about mathematical concepts. Purposeful, rich classroom discourse offers students the opportunity to express their ideas and thinking, and to critique the reasoning of others in a variety of ways (writing, drawing, verbal). Ideas for supporting student discourse are also provided from Pathways2Careers.

Why: Purposeful implementation of classroom discourse allows students to activate funds of knowledge and to refine their mathematical understanding.

How: When students have frequent opportunities for discussion, they find various paths to solutions and reveal knowledge or misunderstandings to educators. The process also allows educators to honor students' culture, lived experiences, and evolving math identities.

Cross-Curricular Connections

What: Cross-curricular connections are connections between knowledge and/or skills that can be made between two or more areas of study. These connections can be made by teachers or students.

Why: The purpose of planning cross-curricular connections in an instructional sequence is to ensure that students build connections and recognize the relevance of mathematics beyond the mathematics classroom.

How: When planning with HQIM, look for opportunities to make explicit connections to other content areas, including the examples provided for each standard.

Career and Skill Connections

What: The knowledge and/or skills students are mastering within each standard can be directly connected to various careers. These connections can be made by teachers or students and can provide motivation for students as they work through mathematical topics.

Why: Understanding and recognizing the relevance of mathematics beyond the mathematics classroom is important. This is particularly valid for students who may not plan on working in a

"mathematics" field.

How: When planning with HQIM, look for opportunities to make explicit connections to careers, including the examples provided for each standard.

Template of the New Mexico Cluster Level Planning Support for the New Mexico Mathematics Standards

Grade	*CCSS Domain*	*CCSS Cluster*
Grade level	CCSS domain	CCSS cluster statement summarizing the group of related standards
Standard and icons that indicate which aspect of rigor it aligns with		
Standard		**Standards for Mathematical Practice**
Full text of the standard.		Correlation of the standard to the Standards for Mathematical Practice to which it aligns, including a link to a descriptor of what teachers and students should be doing.
Clarification Statement		**Students Who Demonstrate Understanding Can...**
Clarifies the language of the standard.		The skills students perform to demonstrate comprehension of the standard.
DOK		**Blooms**
Correlation of the standard to Webb's Depth of Knowledge.		Correlation of the standard to Bloom's Taxonomy.
Conceptual Understanding, Procedural Skill and Fluency, and/or Application		
Highlights the aspect(s) of rigor the standard is aligned to, and descriptors for which portions of the standard fall under each aspect of rigor.		
Assessment Items		
When available, you should use your locally selected or created high quality instructional materials. However, the following are example assessment items you can use if you don't have local instructional materials available.		
Provides at least one high-quality formative assessment item aligned to the standard, as well as a link to more items.		
Common Misconceptions		
Provides guidance on where student misconceptions might occur.		

Planning for Multi-Layer System of Support (MLSS) & Universal Design for Learning (UDL)		
Layer 1 *Core Instruction + UDL*	*Layer 2* *Core + UDL + Targeted*	*Layer 3* *Core + UDL + Targeted + Intensive*
Layer 1 ensures that all students receive strong instruction in a high-quality differentiated core curriculum that is based on the principles of UDL. This includes school-wide implementation of positive behavioral interventions and supports, data-driven instruction, targeted interventions in small group instruction, universal screening, and English Language Development (ELD) for English Learners (ELs).	Layer 2 interventions should be focused on delivering individualized and targeted support (pre-teaching and re-teaching) for students on a grade-level trajectory. The interventions must be aligned with Layer 1 skills. Students should be provided with additional time and intensity in a small-group setting.	Layer 3 interventions should be provided individually or in small groups. Students are grouped according to their skill needs. The goal is for each student to acquire academic skills that will persist and transfer when the student returns to core instruction. If needed, specialized teachers may provide specific intervention instruction based on the needs identified by the data.

Vertical Alignment		
Consider using this coherence map to help guide your planning https://tools.achievethecore.org/coherence-map/7/30/308/308		
Previous Learning	*Current Learning*	*Future Learning*
Lists skills relevant to current learning that students should have already mastered.	Lists skills within the current learning that students will master.	Lists skills from upcoming learning that students will need to be able to master based on what they are learning now.
Culturally and Linguistically Responsive Instruction		
Consider these resources for vocabulary from Pathways2Careers: • https://engage.pathway2careers.com/api/staticcontent/lms/materials/P2CMath/P2C%20Math%20Glossary.pdf • https://engage.pathway2careers.com/api/staticcontent/lms/materials/P2CMath/P2C%20Math%20Vocabulary%20Graphic%20Organizer.pdf		
Consider these questions as you plan for instruction that is culturally and linguistically responsive: • How can you design your mathematics classroom to intentionally and purposefully legitimize the home culture and languages of students and reverse the negative stereotypes regarding the mathematical abilities of students of marginalized cultures and languages? • How can you create connections between the cultural and linguistic behaviors of your students' home culture and language and the culture and language of school mathematics to support students in creating mathematical identities as capable mathematicians that can use mathematics within school and society?		
Validate and Affirm	*Build and Bridge*	*Linguistic Vocabulary Support*
Provides ways to build connections between the families in the community and the mathematical content, as well as examples that connect the math to students' home lives.	Provides information on supporting students as they learn mathematics by starting with conceptual knowledge that students can make connections to based on their prior knowledge. Also provides information on helping students build positive mathematical identities.	Provides ideas and supports for helping students learn new academic vocabulary and making connections to their prior knowledge.

Suggested Student Discourse Questions
Consider this resource for student discourse from Pathways2Careers: https://engage.pathway2careers.com/api/staticcontent/lms/materials/P2CMath/P2C%20Math%20Academic%20Conversation%20Cards.pdf
Provides questions teachers can employ to increase student discourse.
Cross-Curricular Connections
Provides various connections between the standard and the knowledge and skills that students might use in other content areas.
Career and Skill Connections
Provides various connections between the standard and future careers/skills students will need for future careers.