Interventions in High Quality Tiered Mathematics Instruction

Technical Assistance Manual

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Contributions

Todd Call
Director of Strategic Initiatives,
Utah State Board of Education

Laura Cheney
Teacher Specialist, East High School,
Salt Lake City School District

Rachel College
Educational Leadership Specialist,
Utah State Board of Education

Chantel Cowan
Curriculum Director,
Tooele County School District

Dr. Kami Dupree
Educator Development Specialist,
Teaching & Learning
Utah State Board of Education

Whitney Grant
Secondary Mathematics Specialist,
Assessments and Accountability
Utah State Board of Education

Melissa Hamilton
Elementary Teaching & Learning Director,
Murray School District

Brook Hatch
Secondary Mathematics Specialist,
Special Education
Utah State Board of Education

Lindsey Henderson
Secondary Mathematics Specialist,
Teaching & Learning
Utah State Board of Education

Joleigh Honey
Mathematics Equity Specialist,
Special Education
Utah State Board of Education

John Hughes
Cottonwood Elementary Principal,
Emery School District

Melissa Mendenhall
Elementary Science Specialist,
Teaching & Learning
Utah State Board of Education

Sydnee Seager
Multi-Tiered System of Supports (MTSS)
Project Manager, Special Education
Utah State Board of Education

Becky Unker
Specially Designed Instruction and
Elementary Mathematics Specialist,
Special Education
Utah State Board of Education

Overview and Purpose

In Utah classrooms, it is expected that every student receives high quality instruction in mathematics. The purpose of this document is to aid teachers in achieving this goal by outlining the planning and instructional delivery processes that teachers can enact to ensure that each student has access to demonstrating competency within the core standards. Teachers combine the principles of the High-Quality Instruction (HQI) cycle with tiered instruction to plan, implement, and reflect on how their instructional practices support each student in meeting rigorous academic outcomes. This document describes tiered instruction and its purpose. It is intended to support educators in aligning their efforts to provide intervention with tiered instruction using the six steps of the HQI cycle.

The Utah State Board of Education outlines this cycle in the Utah's HIgh Quality Instructional (HQI) Cycle. Part of this cycle is to collect data throughout Tier 1 instruction. Doing this assists educators and LEAs in identifying students who may need additional support. Tiered instruction not only aids students who may need additional support but improves learning for all students by providing tiered instruction that identifies student strengths and offers targeted supports that address learning deficits. This strategy ensures that students with identified disabilities who receive special education services, students participating in gifted and talented programs, and students who are multilingual learners (ML) all benefit from efforts to provide tiered instruction.

What is Tiered Instruction?

Tiered instruction "has to do with how high-quality instruction is implemented. It is implemented in scaffolded tiers, or phases, from less intensive to more intensive."[1] It is a model that provides students with opportunities that meet their different learning needs so that they can find success and make progress towards grade-/course-level standards. The Utah Multi-Tiered System of Supports for Mathematics (UMTSS) framework uses this method and focuses on three instructional tiers that are engineered to meet student needs using a systematic approach. Understanding students' strengths and areas of

1 Allsopp, D., Alvarez McHatton, P., Ray, S. & Farmer, J. (2010). Mathematics RTI: A Problem-solving Approach to Creating an Effective Model. Palm Beach Gardens, FL: LRP Publications.

Overview and Purpose

What is Tiered Instruction?

need is a vital part of MTSS and can help educators develop strategies as well as support effective plans for student learning.

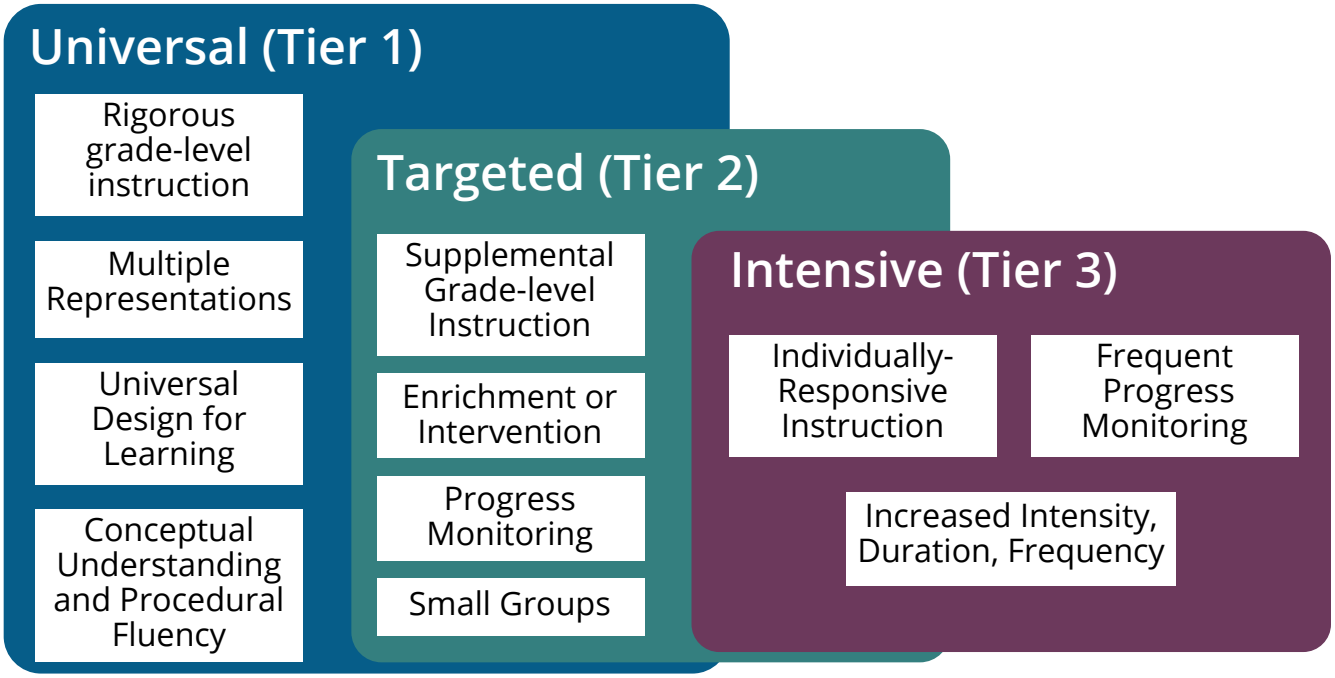
In UMTSS, every student receives Universal (Tier 1) instruction from a state-qualified teacher. Quality Tier 1 instruction provides a safe learning environment and increases equitable access to rigorous grade-/course-level academic learning for each student. Implementation of interventions using tiered instruction is intended to provide a method for layering high quality instruction to ensure student success with grade-/course-level content. As such, it is vital that students are not removed from Tier 1 instruction but are provided Tier 2 and 3 in addition to Tier 1 as appropriate. When students are exceeding or not making adequate progress in Tier 1, they should be provided additional support. Tier 2 and 3 interventions should be purposeful, intentional, and aligned to Tier 1 instruction. Moreover, it is important to understand that any student may also need and receive, regardless of other services provided, Targeted (Tier 2) or Intensive (Tier 3) instruction in addition to Universal instruction.

The advantage of a tiered instruction approach is that it is fluid and flexible. This means that students aren't stuck in any of the tiers and can move in and out according to their specific learning needs.

All students benefit from tiered instruction. Students with disabilities (SWD), then, must receive Tier 1 instruction along with specially designed instruction (SDI) as identified by the IEP. Additionally, students with disabilities may receive Tier 2 or Tier 3 instruction as determined by individual student need.

Instruction Tiers for mathematics

It is important to note that tier names refer to instructional strategies or the intensity of services. Tier names do not refer to the student receiving instruction, the location of service, or the service provider



Graphical Example based on Utah's Multi-Tiered System of Supports for Mathematics (UMTSS)

Universal: Tier 1

Tier 1 instruction is rigorous grade-/course-level instruction focusing on cohesive Utah Core Standards for Mathematics. Teachers implement evidence-based instructional strategies, provide students opportunities to make sense of mathematics, using a variety of student grouping strategies (individual, small group, whole group), and allow enough time for students to respond to instruction. Conceptual understanding and procedural fluency build across mathematical tasks with the use of multiple representations. Each student is provided multiple opportunities to interact with content, demonstrate understanding, and show progress. Teachers implement Universal Design for Learning (UDL) and differentiation to meet the needs of each student. Tier 1 instruction ensures at least 80% of students are mastering the concept.

Instruction Tiers for mathematics

Targeted: Tier 2

Some students may need supplemental instruction and support (enrichment or intervention) that is systematically aligned with focused grade-/course-level core standards. Enrichment includes using instructional strategies that deepen and extend student understanding within and across concepts. Intervention includes using explicit instruction (teacher guidance to make concrete connections between concepts) to connect student understandings already developed during Tier 1 instruction. Tier 2 instruction is typically provided in small groups to the 20% or fewer students who did not achieve mastery in Tier 1. This includes ongoing progress monitoring to determine if the targeted interventions are effective in closing the achievement gap or if adjustments need to be made.

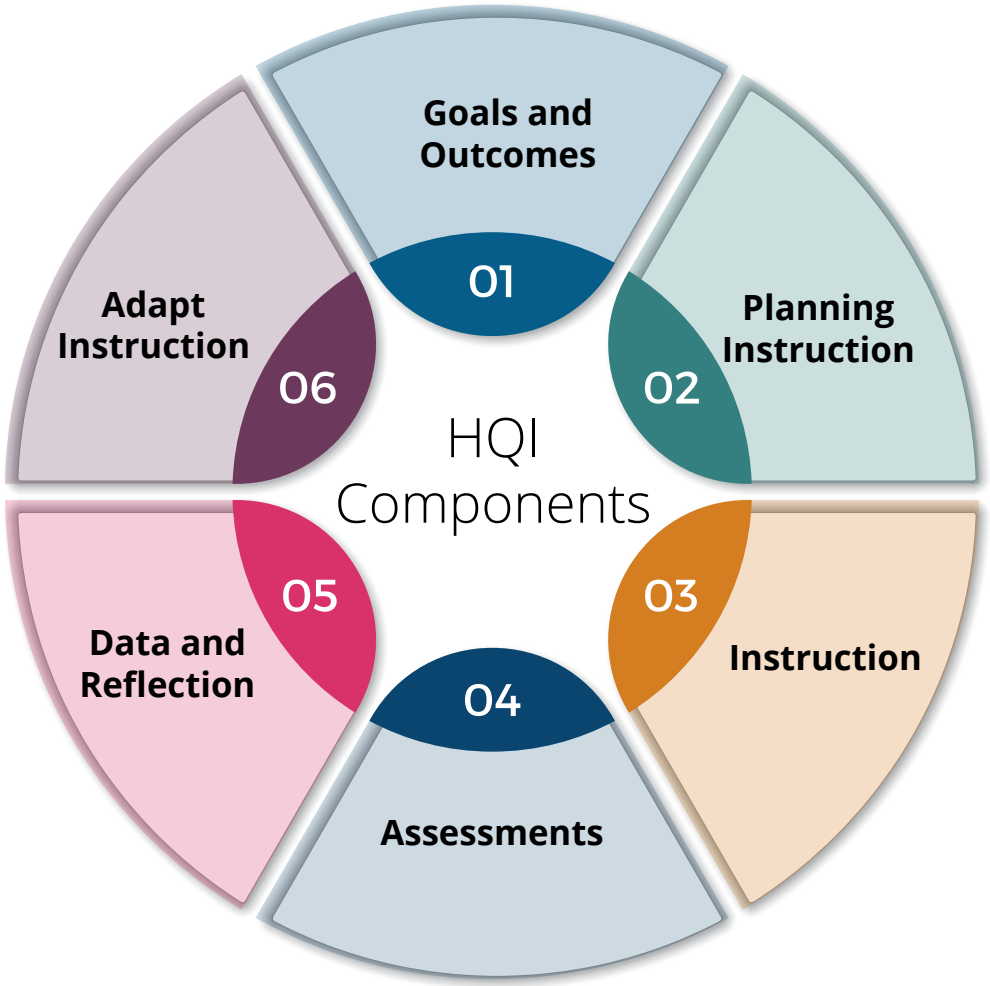
Intensive: Tier 3

A few students, generally less than 5% may need more intensive, individually responsive instruction than provided in Tier 2 instruction. Tier 3 instruction has a focus on grade and course-level content, which may include targeted and identified prerequisite skills needed to understand grade-/course-level standards. Intensive instruction may also focus on above-grade-/course-level standards that are connected to grade-/course-level content; however, emphasis should be placed on depth within the current grade-/course-level standards before acceleration. Teachers providing intensive (Tier 3) instruction should have a deep understanding of content learning progressions. Tier 3 instruction is frequent and ongoing, but not permanent, as it is adjusted due to the result of a student's response to intensive intervention.

Tiered Instruction Aligned to HQI Cycle Steps

The HQI cycle is iterative. The series of steps are dynamically applied in teaching and learning cycles with both short- and long-term goals. As teachers combine these processes with the tiered system of instruction, they plan, implement, and reflect on how their instructional practices can support each student in honoring their funds of knowledge and meeting rigorous grade-/course-level outcomes.

Each step listed below is part of the HQI cycle. Beneath these steps, we outlined how each tier from the MTSS can be combined and aligned to the HQI step. These specific practices are intended to demonstrate how teachers might plan, implement, and reflect on their instruction.



Example of the HQI Components based on Utah's High Quality Instructional Cycle for LEAs.

Step 1: Goals and Outcomes

Connect learning intentions and success criteria to standards and student data and incorporate high expectations that take unique learner characteristics into account.

Goals and Outcomes: Tier 1

- Design well-defined learning intentions, success criteria, and outcomes based on grade-/course-level standards.
    - Allow for student flexibility to choose how to best demonstrate learning as needed.
- Provide success criteria to maximize individual student growth and competence.
- Create developmentally appropriate and challenging goals based on individual student strengths, interests, and needs.
- Create clearly defined success criteria as a collaborative team to cultivate a shared understanding of when students have demonstrated learning of goals.
    - Write criteria in student friendly language.

Goals and Outcomes: Tier 2

- Empower individual student strengths by relating these to the intended learning intentions, success criteria, and outcomes during Tier 1 instruction.
- Identify one or more specific skills, gaps, or misconceptions to support proficiency of the targeted grade-/course-level standard.
- Maintain grade-/course-level expectations.
- Provide enrichment with emphasis placed on depth within the current grade/course-level standards.

Goals and Outcomes: Tier 3

- Empower individual student strengths by relating these to the intended learning intentions, success criteria, and outcomes during Tier 1 and/or Tier 2 instruction.
- Identify content gaps in student learning connected to goals in Tier 1.
    - Provide intensive, individually responsive instruction to these gaps, which may include targeted and identified prerequisite skills needed to understand grade-/course-level standards.
- Provide enrichment with emphasis placed on depth within the current grade-/course-level standards and then acceleration, as appropriate.

Step 2: Planning Instruction

Consider strategies that personalize, accommodate, scaffold, access background knowledge, and use evidence-based curricular options, when available.

Planning Instruction: Tier 1

- Determine learning progressions, including to what degree students need to master concepts and skills for standards, courses, and grade-levels.
- Collaborate with colleagues (general education, special education, multilingual learner educators, etc.) to consider strategies to personalize, accommodate, scaffold, access background knowledge, etc., that will create clear decisions to ensure students receive supports, as appropriate.
- Plan instruction utilizing multiple means of engagement, representation, action, and expression.
    - Identify a variety of strategies and representations that link background knowledge to current goals and outcomes.
    - Understand how standards connect to other standards within the same course or grade level.
- Personalize learning experiences, including considering accommodations and/or assistive technology, in order to bridge the background knowledge asset(s) to content/learning objective expectations.

Planning Instruction: Tier 2

- Personalize instruction to meet intervention needs for Tier 1 content.
    - Encourage students to self-assess using clearly identified success criteria.
- Further personalize learning experiences, including considering accommodations and/or assistive technology, in order to bridge the background knowledge asset(s) to content/learning objective expectations.

Step 2: Planning Instruction

Planning Instruction: Tier 2

- Design intentional instructional strategies that have demonstrated evidence of effectiveness and are aligned to the targeted intervention or enrichment.
- Flex Tier 2 grouping, as appropriate, based on data and individual student needs.

Planning Instruction: Tier 3

- Provide intensive support for each student, guiding progress toward learning intentions and success criteria.
- Consider when and how to deliver more intensive intervention within the school day.

Step 3: Instruction

Incorporate student agency, customized supports, opportunities to read, write, speak, and listen while providing multiple opportunities to show mastery over time.

Instruction: Tier 1

- Implement evidence-based instructional strategies using a variety of student grouping strategies (e.g., individual, partners, small group, whole group).
- Provide instruction that allows all students multiple opportunities over time to interact, show progress, and demonstrate understanding with rigorous grade-/course-level content.
- Incorporate equitable instructional practices that:
    - Anticipate student needs.
    - Activate prior knowledge .
    - Elicit and challenge student thinking.
    - Facilitate meaningful discourse through purposeful questioning.
    - Engage students in listening to and evaluating their own and other students' thinking.
    - Provide an appropriate level of struggle based on unique learner characteristics.
    - Provide scaffolds to ensure all learners access grade-/course-level content.
- Implement the curriculum consistently and accurately.

Instruction: Tier 2

- Monitor student progress toward desired learning intentions.
    - Identify students in need of interventions.
- Implement targeted, evidence-based, in-class interventions as needed to support personalized learning and sense making while also providing instruction that is fluid and flexible.
- Implement instruction that supports Tier 1 student learning intentions, aligns with the grade-/course-level concept, and that is on grade level.
- Provide multiple opportunities to master content before determining students in need of more intensive interventions (e.g., additional instruction outside of class time.)

Step 3: Instruction

Instruction: Tier 2

- Provide structures that allow students to exit Tier 2 once they show competency in the identified targeted intervention area(s).

Instruction: Tier 3

- Ensure consistent delivery of responsive, explicit instruction through intensive interventions.
- Base intensive interventions on:
    - Individual needs.
    - Fluid and flexible grouping.
    - Evidence.
    - Ongoing monitoring.

Step 4: Assessments

Design and use formative assessment practices that are student centered with multiple methods for demonstrating competency.

Assessments: Tier 1

- Assess through an ongoing and continuous process to measure where students meet the success criteria.
- Use a variety of aligned formative assessments to inform students and teachers of learning progress towards success criteria and the students' needs.
- Use success criteria to support students with assessing their understanding of learning intentions.
    - Enable students to take an active role in their own learning.

Assessments: Tier 2

- Use data from success criteria, universal screening, diagnostic assessments, and other sources to identify students for Tier 2 instruction, who need additional targeted support to show mastery of content.
    - Allow students to show mastery in a variety of ways, for example, multiple representations, conceptual understanding, etc.
- Access multiple measures to identify students for Tier 2 interventions.
- Involve students, along with the instructional team, in the development of the problem-solving processes to select, implement, and evaluate Tier 2 instruction based on the data from (common) formative assessments.
- Use valid and reliable progress monitoring (as feasible as possible) to support decisions related to student progress toward intervention goals.
- Move students back to Tier 1 once they have met the success criteria within Tier 2.

Step 4: Assessments

Assessments: Tier 3

- Continually assess and use in-depth analysis of each student's data to inform the instruction, interventions, extensions, and flexible movement in and out of Tier 3.
- Use formative assessment tools to identify what students do and don't understand related to the success criteria.
- Use valid and reliable progress monitoring (as feasible as possible) to support decisions related to student progress toward intervention goals.

Step 5: Data and Reflection

Analyze and reflect on student errors and misconceptions, and outcomes. Meet with collaborative teams and use a variety of data to reflect on instruction.

Data and Reflection: Tier 1

- Use data obtained from ongoing cycles of instruction and assessment to inform the next instructional step(s).
- Use a variety of data from an individual student (e.g., use of various representations, multiple opportunities to demonstrate mastery, assessment for conceptual understanding) to identify strengths and areas for improvement.
- Meet with collaborative teams and use a variety of data (e.g., schoolwide universal screening data, student work on tasks and/or assessments) to reflect on instruction.
- Reflect on possible adjustments to whole-group instruction (e.g., "how could this be taught more effectively") rather than on introducing interventions.

Data and Reflection: Tier 2

- Evaluate both formative and summative data regarding student understanding of learning intentions to identify a small subset (generally fewer than 20%) of students needing additional targeted support.
- Use various data aligned to success criteria to identify targeted support needed as it relates to learning intentions.
- Use data and reflection to determine what instructional changes can be made to support learners.

Data and Reflection: Tier 3

- Engage the student, colleagues, parents, or other stakeholders in evaluating previous interventions.
- Select, implement, and monitor outcomes associated with additional intensive interventions.
- Analyze results of ongoing assessment and assess each learner's progress to inform decisions regarding additional instruction, interventions, and flexible movement in and out of Tier 3.

Step 6: Adapt Instruction

Adjust plans for instruction based on student needs by extending and deepening learning, providing appropriate interventions, and incorporating feedback.

Adapt Instruction: Tier 1

- Provide sufficient time for students to engage with grade-/course-level concepts so that students can build a robust understanding.
- Determine instructional practices (e.g., scaffolding, differentiation) that allow for effective reteaching and incorporating feedback.
- Use appropriate strategies and resources to adapt instruction that addresses diverse learning strengths and needs.

Adapt Instruction: Tier 2

- Use data from success criteria to determine when instructional change is needed.
    - Identify students who need additional targeted support to demonstrate understanding of content (i.e., multiple representations, conceptual understanding).
- Provide scaffolds for the grade-/course-level learning experience that maintains the cognitive demand in Tier 1.
- Provide sufficient time for students to engage with grade-/course-level concepts so that students can build a robust understanding.
- Ensure students have the necessary support to transfer skills to Tier 1, grade-/course-level content.

Adapt Instruction: Tier 3

- Address Tier 3 after adequate Tier 1 instruction and Tier 2 interventions have been implemented with fidelity and documented.
- Provide targeted scaffolds for the grade-/course-level learning experience that maintains the cognitive demand in Tier 1.
- Provide sufficient time for students to engage with grade-/course-level concepts using spaced practice so that students can build a robust understanding.
- Provide students flexible entry and exit between the three tiers.

References and Resources

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- Allsopp, D., Alvarez McHatton, P., Ray, S. & Farmer, J. (2010). Mathematics RTI: A Problem-solving Approach to Creating an Effective Model. Palm Beach Gardens, FL: LRP Publications.
- National Council of Teachers of Mathematics. (2014). Principles to Actions. National Council of Teachers of Mathematics. Retrieved from: https://www.nctm.org/PtA/.
- National Center on Intensive Intervention. (2017). Taxonomy of Intervention Intensity Overview Handout. U.S. Department of Education Office of Special Education Programs. Retrieved from: https://intensiveintervention.org/resource/taxonomy-intervention-intensity-handout.

Resources

The following lists some further resources for implementing high quality instruction in mathematics:

- Universal Design for Learning
- Utah's MTSS Framework in Mathematics
- Utah's Portrait of a Graduate
- Utah's High Quality Instruction Cycle
- Utah Core Standards for Mathematics