

# KANSAS MULTI-TIER SYSTEM OF SUPPORTS & ALIGNMENT



Math:  
Implementation

## Math Implementation Guide

2022-2023 Academic Year



## Introduction to Document

The Kansas Multi-Tier System of Supports (MTSS) and Alignment K-12 Math Implementation Guide has been created to assist teams in utilizing the structures necessary to begin implementation of the Kansas MTSS and Alignment framework. This guide also provides steps to support districts in successfully completing the tasks and decision making necessary for a sustainable system.

Content-area-specific guides for reading, behavior and social-emotional learning, and preschool are companion documents to this one, providing information specific to each respective content. All Kansas MTSS and Alignment documents are aligned with the [Kansas MTSS: Innovation Configuration Matrix \(ICM\)](#), which describes the critical components of the Kansas MTSS and Alignment framework and what each component looks like when fully implemented, and the [Kansas Multi-Tier System of Supports: Research Base](#), which provides a basic overview of the research support for the Kansas MTSS and Alignment.

[www.ksdetasn.org/mtss](http://www.ksdetasn.org/mtss)

## Acknowledgements

A significant commitment of time and energy from numerous Kansas educators and their districts, organizations, and partners made this document possible. Their efforts to learn and help others understand what it takes to implement an MTSS within schools is reflected in this document. This grassroots effort on the part of Kansas educators indicates a commitment to meeting the needs of every student and sharing wisdom from the field and the research. As the list of individuals and districts that have contributed to this effort over the past many years has become too long to detail, a collective expression of gratitude is offered here to everyone who has contributed to the concepts, ideas, and knowledge that are reflected in all Kansas MTSS and Alignment documents.

This document was produced under the Kansas State Department of Education Technical Assistance System Network (TASN) Grant Title VI, Part B IDEA CFDA#84.027 Project #21006. Authorization to reproduce in whole or in part is granted. Permission to reprint this publication is not necessary.

### **Recommended citation:**

Kansas State Department of Education. (2022). Kansas Multi-Tier System of Supports and Alignment: K-12 Math Implementation Guide. Topeka, KS: Kansas MTSS and Alignment Project, Kansas Technical Assistance System Network.

The contents of this resource were developed under an agreement from the Federal Department of Education to the Kansas State Department of Education. However, the contents do not necessarily represent the policy of the Department of Education, and endorsement by the Kansas State Department of Education or the Federal Government should not be assumed. Kansas MTSS and Alignment is funded through Part B funds administered by the Kansas State Department of Education's Special Education and Title Services. Keystone Learning Services does not discriminate on the basis of race, color, national origin, sex, disability, or age in this program and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Keystone Learning Services Executive Director, 500 E. Sunflower Blvd, Ozawie, KS 66070, 785-876-2214.

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## Kansas MTSS & Alignment Implementation Steps

Step 1: Review and Validate Universal Screening Data

Step 2: Analyze Data

Step 3: Use Data to Group Students

Step 4: Determine Focus of Intervention

Step 5: Progress Monitoring

Step 6: Document Interventions

### Defining Each Implementation Step

#### Step 1A: Review and Validate Universal Screening Data, Validity at the System Level

In addition to considering the validity of scores for individual students, the building leadership team should review systemic issues that could affect the validity of screening data. The building leadership team must also review the fidelity of administration of the universal screening assessment by discussing and reviewing any information collected regarding the following issues:

- Were the directions for the administration of the screening assessment followed exactly?
- Were the time limits for each test followed exactly?
- Was shadow scoring used to check scoring fidelity?
- Was the assessment calendar followed?
- Have all staff members who administer the assessment been trained?

#### Step 1B: Review and Validate Universal Screening Data and Validity at the Student Level

The following are some questions that the collaborative teams should consider when validating the screening results:

- Was the screening assessment administered with fidelity?
- Were there environmental circumstances or events in the student's life that could have impacted score results? For example, was the student sick on the day of the universal screening assessment? Had a traumatic event occurred recently?
- What other reasons can be identified for a lack of confidence in the score? For example, does the student exhibit inconsistent patterns of performance across data collection events? In other words, are there student characteristics that we need to consider when interpreting the results of a specific assessment?

#### Step 2: Analyze Data

The purpose of analyzing data as a Building Leadership Team is to have building-wide, system-level discussions, by looking at what universal screening data is currently available. After every universal screening administration, the Building Leadership Team will review building-level data to determine if the core curriculum has sufficiently met the needs of most students (80% or more students at or above benchmark) and, if not, provide a general understanding of how many students might need additional Tier 2 or Tier 3 support from the system. There should also be an intentional effort to communicate the needed PD or other issues to the District Leadership Team, as there could be district-wide issues that need to be addressed, or the district might need to allocate resources differently.

If fewer than 80% of students meet the benchmark, several potential causes should be considered:

- Are core instruction and core curriculum being implemented with fidelity? How do you know?
- Is core instruction taught using evidence-based practices?
- Are concepts being taught to mastery?
- Are there sufficient examples, explanations, and opportunities for practice to support new learning?
- In terms of differentiating the core, what thoughts arise with regard to the strengths and needs of district staff?
- Are professional development or supports needed for teachers regarding the core curriculum or instruction?

When analyzing mid-year screening data, it is important for teachers to look at individual student growth. Often a student who is performing well below grade level will score at risk on the mid-year screener; however, if the student has made typical or aggressive growth (>40<sup>th</sup> percentile growth), then the collaborative team should consider maintaining the current intervention plan. Regardless of a student's risk level at mid-year, students should be making typical or aggressive growth from fall to winter. If a student is making moderate or flat growth (<40<sup>th</sup> percentile growth) or digressing, then the collaborative team needs to problem solve possible reasons behind the lack of growth. Student attendance, teacher attendance, intervention focus and/or strategies, intervention dosage, and group size are some factors to consider when a student is not making adequate growth. In these cases, it is the collaborative team's responsibility to revise or intensify the current plan, as needed, in order to improve students' trajectory toward the end-of-year benchmark.

### Steps 3 & 4: Use Data to Group Students and Determine Focus of Intervention

Once the universal screening data has been analyzed and validated, collaborative teams should work together to gather additional needed information, as outlined in this section, and group students appropriately for intervention. All students, kindergarten through 12<sup>th</sup> grade, take the universal screener three times per year. This includes students receiving special education services, title services, and ELL support. Below is a general process for using data to group students, determine focus of intervention, and progress monitor. (Access math grouping flowcharts and descriptions for specific assessment systems [here](#).)

#### Tier 1

Students who fall under the Tier 1 category are at or above their benchmark according to their universal screening score (e.g., aMath, MAP Growth, earlyMath, Concepts & Applications), meaning they scored at or above the 40<sup>th</sup> percentile. ALL students should receive 50 to 60 minutes of core instruction with differentiation.

#### Tier 2

Students who fall under the Tier 2 category are below the benchmark according to their universal screening score. These students should receive 20-30 minutes of intervention at least four days per week beyond their daily 50 to 60 minutes of core instruction. Use a placement test to determine the instructional focus for each student's intervention time. If no curriculum placement test exists, use other diagnostic information including any relevant reports within the assessment

system. Group students based on instructional focus and begin comprehensive protocol intervention. Progress monitor on grade level every two to four weeks. If students are making adequate progress, continue the intervention. If students are not making adequate progress, conduct an error analysis and/or formal diagnostic in order to customize and continue the intervention.

### Tier 3

Students who fall under the Tier 3 category are well below benchmark. These students should receive 20-30 minutes of intervention at least four days per week, in addition to their daily 50 to 60 minutes of core instruction. Use norms charts within the assessment system to determine each student's instructional level. Next, use a placement test at the determined instructional level to identify the instructional focus for each student's intervention time. If no curriculum placement test exists, use other diagnostic information including any relevant reports within the assessment system. Place students in groups based on instructional focus and begin comprehensive protocol intervention within [critical areas](#) of mathematics that ensure future success in [algebra](#). As teams begin to document students' placement, it is imperative that students be recorded in such a way to ensure that those with similar mathematical deficits are grouped together.

Developing a process for grouping students and determining instructional focus for math are somewhat more complex tasks than those applied for reading. It is important to note that fluency/accuracy grouping cannot be used for math in the same way that it is for reading. In addition, because the math proficiencies are completely intertwined, a comprehensive approach to intervention is often more advantageous than addressing a single skill/concept.

### Fluid Grouping

While it might not be necessary to restart the grouping process at each benchmark period, whenever a universal screening is conducted, it is essential to revisit and refine the alignment of intervention groups. Analysis of the current data and progress monitoring groups in light of the newly established benchmark data is critical to ensure that the current groups contain homogeneous instructional levels and foci.

### Further Instructional Considerations for Intervention

#### Fluency

Computational fluency appears to be an underlying issue for many students, and the 2009 *IES Practice Guide: [Assisting Students Struggling with Mathematics: Response to Intervention \(RtI\) for Elementary and Middle Schools](#)* recommends that "Interventions at all grade levels should devote about 10 minutes in each session to building fluent retrieval of basic arithmetic facts" ([Gersten et al., 2009](#)). The Kansas MTSS and Alignment, for good reason, has expanded this 10-minute devotion to all students in grades K-8 ([read Computational Fluency Brief](#)), but it could also be appropriate for high school students that exhibit deficits with basic computation. Fluency instruction and practice should be differentiated for each student, based on where he/she is currently performing with basic facts. Differentiation cannot be stressed enough within this practice time. Content and instruction must be individually tailored to best ensure promising practice. Especially when working with students to build proficiency or automaticity, teachers should consider how information might be chunked or grouped into smaller pieces for instruction (Riccomini &

Witzel, 2010). Strategic progressions and chunking of fact families and/or like strategies (e.g., doubles, near doubles) can help avoid overloading students' processing capacity (working memory) while facilitating conceptual understanding of specific fact combinations rather than solely memorization. **According to the instructional hierarchy, acquisition (accuracy) precedes fluency building; therefore, individual practice (timed worksheets, computer-based programs, etc.) should only be utilized once students have shown accuracy with little adult support (Haring et al., 1978).**

### *Fractions*

For students at the intermediate and secondary levels, additional skill assessment with fractions should be considered for those who score low on any of the screening measures (Riccomini & Witzel, 2010). Under such circumstances, collaborative teams might need to consider more diagnostic information around rational number acquisition, computation, and application in order to determine instruction for an appropriate skill. The *2010 IES Practice Guide: [Developing Effective Fractions Instruction for Kindergarten Through 8th Grade](#)* lists five recommendations to help educators improve students' understanding of fractions. The following examples show moderate evidence:

- Help students recognize that fractions are numbers and that they expand the number system beyond whole numbers. [Use number lines as a central representational tool](#) in teaching this and other fraction concepts from the early grades onward.
- Help students understand why [procedures for computations with fractions](#) make sense.

For further guidance on structuring your math intervention protocol and selecting evidence-based practices, refer to the *2021 IES Practice Guide: [Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades](#)*. The IES guide includes six recommendations with strong evidence:

1. Provide systematic instruction during intervention to develop student understanding of mathematical ideas.
2. Teach clear and concise mathematical language and support students' use of the language to help students effectively communicate their understanding of mathematical concepts.
3. Use a well-chosen set of concrete and semi-concrete representations to support students' learning of mathematical concepts and procedures.
4. Use the number line to facilitate the learning of mathematical concepts and procedures, build understanding of grade-level material, and prepare students for advanced mathematics.
5. Provide deliberate instruction on word problems to deepen students' mathematical understanding and support their capacity to apply mathematical ideas.
6. Regularly include timed activities as one way to build students' fluency in mathematics.

## Step 5: Progress

### **Monitoring Progress & Monitoring Instructional Levels**

Universal screening is always administered at the student's current grade level. Progress monitoring, however, always takes place at the student's instructional level. Progress monitoring



students at their instructional level is critical to helping students close the achievement gap between themselves and their peers. The instructional level was determined during the grouping process. That same level should be used for progress monitoring.

### Formal vs. Informal Progress Monitoring Measures

The progress monitoring assessments within the universal screening system are considered formal, and it is recommended that educators use general outcome measures (GOM) as they measure growth over an extended period of time. More informal progress monitoring measures, such as skill-based pre- and post-tests, exit slips, checks for understanding, and student work samples, can be utilized to gauge students' mastery of the specific skills they are working on during intervention. Both formal and informal measures are critical for determining the effectiveness of the intervention. Gains on informal measures should produce gains on the broader GOM, or formal measure, over time.

### Frequency

The recommended frequency of progress monitoring for math within the Kansas MTSS and Alignment framework is every two to four weeks for students receiving Tier 2 or Tier 3 interventions. Seek to conduct progress monitoring on the *instructional level*. Consider individual schools' capacity when determining the frequency of progress monitoring, as the data could indicate changes in grouping. Moreover, due to the sensitivity of some early numeracy measures, schools might choose to monitor more often; however, schools should, at a minimum, monitor once per month.

### Goal Setting

Begin by setting a goal for the student to achieve the end-of-year benchmark corresponding to his/her instructional level. However, for students who are receiving high-quality intervention, it is appropriate to expect more than a year's growth in a year's time, even if the student has not achieved that rate of growth in the past. Once a student consistently scores above the aim line (considering the most recent consecutive data points), the student should be moved to the next instructional level and the goal adjusted accordingly. Students who score in the Tier 3 range need to set ambitious goals. Research indicates that ambitious goals produce better results than lower goals (McCook, 2006; Hattie & Donoghue, 2016; Sides & Cuevas, 2020). Without an ambitious goal, students in intervention can make progress but continue to lag behind grade level without closing the achievement gap between themselves and their peers.

### Analyzing Progress Monitoring Data

Consider these two questions when looking at progress monitoring graphs:

- Is the student growing?
- Is the growth aggressive enough to close the achievement gap?

If students are making adequate progress that will result in meeting their goal, continue the intervention. When students are not making adequate progress, conduct an error analysis and/or formal diagnostic in order to customize and continue the intervention. Prior to conducting a formal diagnostic and/or error analysis, the following questions should be considered:

- Were the appropriate skills/concepts progress monitored at the correct level?
- Has sufficient data been collected to make decisions?



- Was the data accurately graphed?

### Exiting Intervention

Students can be exited from intervention once they have consistently met or exceeded the benchmark according to progress monitoring and/or screening data. It is still recommended that instructors administer a formal progress monitoring measure monthly in order to ensure that these students remain on track to meet the end-of-year benchmark with their peers. Reminder: the benchmark score will continue to increase throughout the year.

### Customizing a Math Intervention

When a student receiving intervention fails to show progress despite data-based adjustments, such as increasing dosage, reducing group size, implementing motivational strategies, and increasing opportunities to respond, teams should consider the need for individual student problem solving to customize the intervention. This is the time for teams to decide first to intensify the instruction or to utilize a formal diagnostic assessment to better identify the unknown skill deficits.

Table 1 can be beneficial to this team conversation. While some factors that influence student learning are indeed outside of our control, this chart is meant to identify how teachers can creatively intensify the intervention. For example, if the team believes the student's lack of commitment to school is impacting their math growth, it then becomes the team's job to find a solution to intensify the student's intervention in a way that addresses that issue. Data should then guide whether their decision is effective or if further problem solving must occur.

Table 1

#### *Research-Based Practices to Consider Regarding Intervention Effectiveness*

Research-Based Practices to Consider Regarding Intervention Effectiveness		
INSTRUCTION	CURRICULUM	PRINCIPLES OF INTENSIVE INTERVENTION
Fidelity of instruction Modeling and guided practice prior to independent practice (I Do, We Do, You Do) Explicit teaching Opportunities to respond Sufficient questioning Check for understanding Sufficient practice	Appropriate match between learner and intervention Appropriate rate of progress to reach goal Instructional focus based on diagnostic process Variety of interests Teaches skills to mastery Appropriate independent work activities	Break problems down into smaller steps Use precise language Repeat language Elicit student explanations Provide explicit modeling Utilize concrete, representational, and abstract manipulatives Use worked examples Provide repeated practice Engage in error correction Fade support Incorporate fluency Move on
SETTING	INDIVIDUAL	
Classroom routines/behavior management supports learning Appropriate person teaching the intervention group Transitions are short and brief Academic learning time is high	Motivation Task persistence Attendance Pattern of performance errors reflect skill deficits Commitment to school	Source: Powell & Stecker (2014)

If intensifying the intervention does not produce results, a team might determine the need to utilize a formal diagnostic, such as KeyMath3 or Tools for Early Assessment in Math (TEAM). In addition, the interventionist can consider administering an error analysis.

To customize the intervention, teachers should use the current and prior grade-level focus standards to determine the necessary components of the individualized plan. Teams will need to analyze all of the data available regarding a student (including the information from the formal diagnostic assessment and error analysis, if completed). Then a hypothesis must be developed about the underlying causes of the student's lack of progress so that a more individually customized intervention plan can be developed and implemented.

### Step 6: Document Interventions

Different methods can be applied to keep these data (screening and progress monitoring) visible and usable. Charts are best for visual representations to help staff members interpret the progress monitoring data in relation to the student's goal. Assessment cards are an additional option for displaying both screening data and progress monitoring information to staff. Whatever method of data display is used, it is important to ensure that data are maintained in a confidential manner but are readily available to staff members who work with the students.

Building Leadership Teams will also need to consider how individual student data will be shared with parents. Specific suggestions on how to share data with families can be accessed through the Kansas Parent Information Resource Center (KPIRC, [www.ksdetasn.org/kpirc](http://www.ksdetasn.org/kpirc))

Interventions need to be logged once students are placed in appropriate groups. The student intervention log ([sample here](#)) and the progress monitoring graph need to be consistently updated so that an accurate record of the interventions and results can be maintained. It is critical that teachers document the instruction that they are providing, the intervention sessions that each student actually attends, and an accurate record of the progress monitoring results. This documentation is critical when analyzing student growth during consistent data review meetings during which instructional adjustments are made according to the team decision rules. This cycle of assessment, adjustment, and adding to the graph or log continues as long as a student requires intervention.

For students who continue to be non-responsive to interventions, it becomes critical to begin moving from a group problem-solving model to a more individualized format. The individual student problem-solving process is what schools have traditionally used for general education interventions, often conducted by student improvement teams (also known as SIT, SAT, TAT, and CARE teams, among other names). Within the Kansas MTSS and Alignment model, the collaborative teams conduct the work of the general education intervention team or student improvement team (SIT).

At any time, a leadership or collaborative team suspects a student may have an exceptionality, the team must refer the student for an initial evaluation. Any parent request for a special education evaluation must be reported to the building administrator or to the appropriate staff

member designated by district special education procedures. Utilization of the Kansas MTSS framework should not delay a student from receiving a special education evaluation. A student does not have to move through all tiers before a referral for a special education evaluation is made. Conversely, having received all tiers of instruction or needing Tier 3 instruction does not solely indicate that a student should be referred for a special education evaluation.

When the Kansas MTSS framework is implemented, all parents must be informed of the nature of student performance data being collected, the general education services being provided, strategies for increasing a student's rate of learning, and parents' right to request an evaluation (K.A.R.91-40-10(f)(2)). Staff members and parents need to understand that a student may be referred for a special education initial evaluation when:

- The school has date-based documentation indicating general education interventions and strategies would be inadequate to address the areas of concern for the student or
- The school has data-based documentation that:
  - The student was provided appropriate instruction by qualified staff in regular education
  - The student was provided repeated assessment of academic achievement to demonstrate the student's progress during instruction.
  - The assessment results were shared with the parents.
  - The results indicated that an evaluation is appropriate ([K.A.R.91-40-7\(c\)](#)).

## Conclusion

Implementing the components of the Kansas MTSS and Alignment framework within a district is a complex and long-term process. While many details have been discussed throughout this guide, educators can also visit the [Kansas MTSS and Alignment Mathematics Repository](#) for a wealth of additional resources and guidance. Contact information for all regional Kansas MTSS Math Trainers is listed on this repository.

## References

- Fuchs, L. S., Newman-Gonchar, R., Schumacher, R., Dougherty, B., Bucka, N., Karp, K. S., Woodward, J., Clarke, B., Jordan, N. C., Gersten, R., Jayanthi, M., Keating, B., and Morgan, S. (2021). *Assisting Students Struggling with Mathematics: Intervention in the Elementary Grades* (WWC 2021006). Washington, DC: National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://whatworks.ed.gov/>
- Gersten, R., Beckmann, S., Clarke, B., Foegen, A., Marsh, L., Star, J. R., et al. (2009). *Assisting students struggling with mathematics: Response to Intervention (RtI) for elementary and middle schools*. Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
- Haring, N. G., Lovitt, T. C., Eaton, M. D., & Hansen, C.L. (1978). *The fourth R: Research in the classroom*. Columbus, OH: Charles E. Merrill Publishing Co.
- Hattie, J. A. & Donoghue, G. M. (2016) Learning Strategies: A synthesis and conceptual model. *Nature/NPJ: Science of Learning*. doi: 10:1038/npjscilearn.2016.13
- McCook, J. E. (2006). *The RTI guide: Developing and implementing a model in your schools*.
- Powell, S. R., & Stecker, P. M. (2014). Using Data-Based Individualization to Intensify Mathematics Intervention for Students with Disabilities. *Teaching Exceptional Children*, 46, 31-37, doi: 10:1177/0040059914523735
- Riccomini, P. J. and Witzel, B. S. (2010). *Response to Intervention in Math*. Thousand Oaks, CA: Corwin.
- Sides, J. D. & Cuevas, J. (2020). Effect of Goal Setting for Motivation, Self-Efficacy, and Performance in Elementary Mathematics. *International Journal of Instruction*. 13(4): 1-16. DOI: [10.29333/iji.2020.1341a](https://doi.org/10.29333/iji.2020.1341a).
- Siegler, R., Carpenter, T., Fennell, F., Geary, D., Lewis, J., Okamoto, Y., Thompson, L., & Wray, J. (2010). Developing effective fractions instruction for kindergarten through 8th grade: A practice guide (NCEE #2010-4039). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from <http://whatworks.ed.gov>
- Stecker, P., & Fuchs, L. (2000). Effecting superior achievement using curriculum-based measurement: The importance of individual progress monitoring. *Learning Disabilities Research and Practice*, 128-134.