

THIRD SPACE LEARNING

# Effective Math Interventions: A Guide for Schools and Districts

Tools, strategies, and advice on implementing Tier 1, Tier 2, and Tier 3 math interventions to raise attainment in the students who need it most

**School and District Leader Guides** 

## THIRD SPACE

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## Introduction

In every math class, there are students who need a little extra help to keep up with their peers. Even for the most experienced teacher, it can be difficult to give those students the supplementary support they need.

In the recent National Assessment of Educational Progress, often referred to as the nation's report card, we saw the steepest decline ever recorded in national proficiency levels for math and reading. Only 39% of 4th Grade students were considered proficient at Math - meaning that 61% of 4th Grade students are not reaching the required standard.

National Assessment of Educational Progress

Math interventions are essential for making sure struggling students are getting additional opportunities to consolidate knowledge and apply their skills over and above classroom teaching.

Here at Third Space Learning, we've provided high quality online one-on-one tutoring to 160,000 students since 2013. We've learned a lot along the way about how to create and facilitate an effective one-to-one intervention program - including what not to do!

In this quide we'll share the knowledge and expertise we've acquired from working with



"Third Space Learning has solved the problem of not having enough time or resources to fill gaps in student learning."



Liz Avery, Math Instructional Coach Renaissance Academy Charter School of The Arts



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## Why do we need interventions?

Schools choose to implement interventions for a number of reasons. These can include:

- Improving academic performance
- Addressing behavioral issues
- Promoting positive social interactions
- Ensuring a safe and inclusive learning environment

Whether the school interventions are for academic reasons or social emotional learning reasons they are designed to provide additional support and resources to help students succeed.

In the early years of schooling, it is not uncommon for students to need interventions in the areas of mathematics, reading, and writing. When good intervention programs are in place

## The importance of math interventions

In math, when learning gaps are not addressed it can become a challenge as students move from one grade level to the next. It is essential that students have a strong understanding of foundational concepts such as number sense which is taught in elementary school, in order to conceptualize higher order, abstract mathematical concepts addressed in secondary school.

In addition, research has shown that the COVID-19 pandemic continues to have a greater impact on learning loss in math, compared to other subjects. As these gaps escalate, they can cause students to fall further and further behind as they struggle to keep up in class. This also directly impacts student confidence and self-esteem which then leads to 'math anxiety', thus creating a vicious cycle.

It's for this reason that the link between elementary school performance and secondary

"Math skills have a profound long-term impact on both individuals and society, and early difficulties in math tend to be compounded as students move through their education. There is therefore an urgent need to tackle learning loss in math, particularly at the elementary level."

'A Space for Maths' - CFEY Report - Loic Menzies, Baz Ramaiah and Catherine Boulton



## Different models for interventions

With a decline in state assessment data post-pandemic, school districts across the country are placing emphasis on intervention models.

- Response to Intervention (RTI) is an intervention educational model that provides academic support to struggling students.
- Multi-Tiered Systems of Support (MTSS) is a broader intervention educational model that takes into account academic support as well as support for behavior, social, and emotional learning.
- Positive Behavioral Interventions and Supports (PBIS) is an intervention model focused on behavior supports for students.

It is likely in the elementary level that students who need academic support very well might need behavior support.

For more information on PBIS, visit the Center on PBIS website.

In the MTSS or <u>RTI intervention</u><sup>2</sup> models, ALL students receive core instruction, core behavior support, and universal screening. Students who require more support receive tiered interventions.

Tiered interventions are structured frameworks designed to provide different levels of support to students. They are typically split into three tiers:



On the following pages you will find detailed recommendations and examples of best practice in math interventions for each tier.

## Tier 1 Intervention

## What is Tier 1 intervention?

Tier 1 math intervention is the initial level of support provided to **students that need it in the classroom**. It is the high-quality, evidence based instructional practices that are part of the core curriculum. Tier 1 interventions are particularly important to the MTSS framework because they provide a baseline to ensure all students receive high-quality education.

## Who delivers Tier 1 intervention?

Tier 1 intervention is typically facilitated by the classroom teacher because it is their responsibility to implement high-quality, evidence based instruction. The classroom teacher is trained to differentiate instruction and provide support to address the diverse

## Why are Tier 1 interventions important?

Tier 1 intervention initiatives are intended to **prevent** students falling behind. It forms the foundation of support for all students in the classroom. By implementing high-quality instructional strategies at the Tier 1 level, schools can ensure that the majority of the students receive effective instruction tailored to their needs. It also helps to identify the

## How can your school implement Tier 1 intervention?

### < ldentify your goal

Use a goal assessment to figure out the focus of your Tier 1 intervention plan. There are many components to the MTSS framework, including academic, behavioral, and social-emotional supports and using a goal assessment will help determine focus areas.

For example, a third-grade student struggling with multiplication might be given a goal assessment that includes:

- Baseline test: Assessing current multiplication skills to determine starting proficiency
- Weekly quizzes: Monitoring progress with brief, focused quizzes
- Monthly benchmarks: Evaluating progress with more comprehensive assessments
- Data review meetings: Regularly scheduled meetings with teachers and intervention
- Specialists to review data and adjust the support plan as needed Select your strategy

Consider the strategies that will help achieve your Tier 1 intervention goal. These should be evidence-based strategies and appropriate for the goal.





## 6 Tier 1 strategies to provide intensification

#### Frequency of lessons

A lot of times, quality is prioritized over quantity. However, more exposure to math concepts and practice opportunities can benefit some students. More frequent lessons also provide opportunities for multiple mathematical strategies, manipulatives and tools to deepen understanding.

#### 2 Opportunities to work in small groups

Small group work helps teachers and students. It allows teachers to target instruction more effectively. It also allows students to receive the specific help that they need with the assignments they are working on.

#### 3 Encouraging students to verbalize their thinking

Keep lessons concise. Who is talking the most? Aim for a classroom where students are active learners and doing most of the talking. They should be at the center of the learning. It also helps to keep them on track and focused on the curriculum.

#### **4** Grouping students

Using the curriculum content as well as informal assessment of students, group students so that they will meet the learning targets.

For instance, when working on the standard algorithm for multiplication, you may want a group that focuses on regrouping and another group where regrouping occurs more than once.

Then decide which students fit into which group, most likely the group sizes will be different! If one group is too big, split this group into smaller groups to work on the same material.

Not all groups may get to work with an adult in one lesson. A rotating schedule can be helpful to try and work with all groups in one week.

#### 5 Positive reinforcement

Math can be challenging and requires problem-solving, communication, metacognition, and perseverance. Praising effort helps encourage students to persevere.

Make positive reinforcement specific and highlight the mathematical thinking or strategy the student is using well. Praising students to the whole class encourages others to adopt the same successful mathematical thinking or strategies.



#### 6 Personalized learning with technology-based interventions

Technology-based interventions have been shown to improve student engagement in the mathematics classroom. Personalized learning motivates students, provides autonomy over their learning experiences and increases their achievement.

Like all interventions, technology-based learning should be evidence-based and support social classroom interactions.

Here at Third Space Learning, our highly trained math tutors use pre-assessment, assessment for learning and post-assessment to monitor student progress and personalize learning in real-time to ensure maximum student achievement.

#### Monitor progress and set a review date

All MTSS strategies must be monitored and evaluated to ensure they are effective. Decide what monitoring will look like and set a date to check in on progress.

For Tier 1 interventions, grade-level curriculum-based assessments are often used to check progress and evaluate the effectiveness of the intervention initiative.

### How does Third Space Learning support Tier 1 interventions?

By targeting the students that really need it, Third Space Learning's personalized tutoring gives teachers more time to deliver high quality whole class teaching. This also means more time on planning and implementing their Tier 1 interventions, making them more effective.

Our <u>Math Resource Library</u> is also full of free classroom resources and PD to help maximize teachers' time - all free of charge!



## THIRD SPACE

## Tier 2 Intervention

## What is Tier 2 intervention?

Tier 2 intervention, also known as **targeted intervention**, is small group lessons aimed at helping students that are not making progress in Tier 1 intervention. The instruction focuses on specific skills that students need to progress. It may be that learners have a gap in their learning and never mastered skills like number sense or fractions but need to

## Who delivers Tier 2 intervention?

Tier 2 intervention is typically facilitated by a trained professional such as an interventionist, special education teachers, or a classroom teacher. The intervention is targeted towards students who require more support than what is provided in the general

## Why are Tier 2 interventions important?

Tier 2 interventions are important because they provide students with remediation and reteaching of foundational skills and provide teachers with information about how a student understands and masters skills.

Ideally, in Tier 2 intervention, a student will make progress, eliminate learning gaps, meet grade level standards, and return to their general class. But, if a learner is not making expected progress, information from Tier 2 is helpful when a student is referred for Tier 3

## How can your school implement Tier 2 intervention?

#### Match the strategy with student need

Teachers should review data from summative assessments, curriculum-based formal and informal assessments, and universal screeners to identify which students need Tier 2 interventions. When you have identified which students have learning gaps, you can administer an additional assessment to identify the specific skills students need to master.

Alternatively, teachers will use behavior assessments to identify students who may need positive behavior interventions and supports (PBIS).

#### Provide training and professional development

Depending on the school, teachers, tutors, or interventionists may plan and deliver instruction. If non-specialists are delivering the intervention, ensure they have training and support.



## Set student goals

Remember that the most effective interventions always start with the goal. So, for effective Tier 2 interventions be sure to start with goal setting, specifically S.M.A.R.T. goal setting. S.M.A.R.T goals are:



For example:

- When given a set of 50 addition and subtraction facts, the student will complete 80% of them within 4 minutes.
- When given a word problem, the student will follow a checklist to complete the problem 4 out of 5 trials.
- When given a word problem, the student will apply a problem solving strategy to correctly solve the problem 4 out of 5 trials.

Identify research-based strategies to teach the skill and set the schedule

Tier 2 interventions can be incorporated into general education. This looks like math teachers planning for small group instruction, using data-driven instruction to create focused and flexible groups, and integrating review and reteaching into Tier 1 instruction.

Typically, Tier 2 lessons will happen 4-5 times per week for 25-30 minutes per session.





### Determine how you will monitor progress

How will you track the goals above and how will you know the student has mastered them? Set a schedule for progress monitoring ahead of time, whether it is weekly, biweekly, or after a specific number of lessons.

Administer assessments and track the data over time in order to monitor and evaluate progress. The data should then be used to review with the school team to determine if the approach is working and/or what adjustments need to be made.

#### Set the timeline for review

After 6-8 weeks, plan to review the student's progress and adjust the goals and strategies if necessary.

## 5 examples of Tier 2 interventions for math

As math specialists, we've listed 5 examples of Tier 2 practices for math that include explicit instruction in math strategies and skills.

**1** Graphic organizers

Graphic organizers can provide structure to help learners organize and manage problem solving.





#### 2 Flashcards or cover-copy-compare

Flashcards or strategies such as cover-copy-compare can be used to develop math fact fluency.

Math Facts		Student Res	Student Response	
6	1 2 - 1 2 0	63	69	
0	3 + 5 8	23	6	
	$ \begin{array}{c c} 1 & 2 \\ \times & 1 & 2 \\ 1 & 4 & 4 \end{array} $	85	85	
9	1 3 - 7 6	90	6	
10	7 + 7	105	106	

#### **3** Online math programs

Online math programs can be used for additional practice on specific skills, building fluency and confidence.



Here at Third Space Learning, we provide personalized one-on-one tutoring for schools delivered by STEM specialists. Students learning with Third Space Learning achieve 7 months of math growth in just 14 sessions and 70% of students who report low confidence at the start of the program say it has improved by the end.



#### 4 Peer tutoring or peer-assisted learning strategies (PALS)

When used effectively, peer tutoring can be a good opportunity for problem solving practice. During the 30-35 minute peer-tutoring sessions, students take turns acting at the tutor, coaching and correcting one another as they work through problems. For this to work, one partner must be secure in the math concept being learned by the second student.

#### 5 Checklists

Checklists support self-monitoring or self-checking. Having a check-list in front of them helps the student to independently check over their work before going through it with a peer tutor, teacher or interventionist.

Name: Date:	My Self-Monitoring Form		
Today in class	Was I paying attention to my assigned work?	V Yes	X No
	Was I following the classroom rules?	V Yes	X No
	Was I paying attention to my assigned work?	Vec.	X No
	Was I following the classroom rules?	V Yes	X No
7 6 5	Was I paying attention to my assigned work?	🖌 Yes	× No
	Was I following the classroom rules?	V Yes	× No
	Was I paying attention to my assigned work?	🖌 Ves	× No
	Was I following the classroom rules?	V Yes	X No
	Was I paying attention to my assigned work?	Ves.	× No
	Was I following the classroom rules?	V Yes	X No
	Total number of vis = My Goal =		
Sig	ned:	2	

### A solution with Tier 3 impact, but Tier 2 affordability

All Third Space Learning tutoring is one-on-one, but because it's delivered online schools can implement it for a large group of students all at the same time, without stretching their workload or budget. This leaves teachers free to focus on whole-class instruction as well as reducing scheduling and staffing issues.



"We just had our first Third Space Learning session and it went great! The kids really liked it and felt like they were learning! One even said he finally felt like math was making sense."

> Michelle Craig, Instructional Coach, Sherwood Forest Elementary, Washington

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## **Tier 3 Intervention**

## What is Tier 3 intervention?

Tier 3 intervention is the most intensive level of support provided to students who continue to struggle academically and/or behaviorally after receiving Tier 1 and Tier 2 interventions. Tier 3 intervention is focused on personalized strategies for students who require intensive assistance to meet learning targets. Tier 3 interventions are the most individualized and intensive of the three tiers and usually take the form of one-on-one

For many schools, the best possible tutoring option is the one in which each student receives targeted one-on-one support from their own dedicated tutor.

Because all Third Space Learning tutoring is delivered online via our highly-skilled and extensively-trained global tutor community, schools access personalized oneon-one tutoring for the price other providers charge for group sessions.

## Who delivers Tier 3 intervention?

Tier 3 interventions are typically delivered by highly trained professionals, which can include special education teachers, intervention specialists, trained interventionists, or trained tutors.

All of our tutors are math specialists and highly trained in the best ways to support and build rapport with students, for example, asking about their interests. Tutors take the time to get to know each student at the start of their time together.

## Why are Tier 3 interventions important?

These interventions are necessary for students who continue to struggle after receiving Tier 1 universal strategies and Tier 2 intervention targeted assistance.

Tier 3 provides frequent, intensive and individualized interventions. A one-size-fits-all approach is not sufficient.

Implementing a personalized support system helps these interventions address specific learning gaps and overcome obstacles in their learning. In turn, this improves behavioral thirds a cardien of by the sector of the math opportunity gap through targeted one-on-one tutoring and flexible resources 12

## How can your school implement Tier 3 intervention?

If after 6-8 weeks of Tier 2 interventions you have students that are still struggling, it's likely time for an individualised approach i.e. a Tier 3 intervention using one-on-one

#### instruction Identify learning gaps

Use diagnostic assessments to identify the specific math skills and concepts that students are struggling with. Assessment data from Tier 1 and Tier 2 interventions can also be used to identify learning needs. You may also want to utilize standard specific math assessments to further pinpoint skills and concepts that are not being mastered.



### Highly qualified personnel and professional development

Ensure that teachers, intervention specialists, or tutors involved in Tier 3 interventions are highly qualified, trained, and equipped to deliver the level of intense, individualized support that is required.

It is important to provide ongoing professional development to support teachers and intervention specialists while also ensuring they stay up-to-date on best practices and research-based interventions.



"I listened in on one session and thought the tutor was excellent: enthusiastic and clear. It's excellent. Students were very engaged and said they liked it. I believe the feeling of liking it comes from feeling successful. They understood what was being explained and they could do it. The tutors were excellent and the students' conceptual understanding was improving."

Schipper Clawson Math Teacher, Frontier Middle School

## Individualized learning plans (ILPs)

Based on the data, educators and intervention specialists can collaborate to design and implement individualized intervention plans for each student based on their unique needs and learning goals.

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- 🛇 Instructional strategies often involving one-on-one or small group sessions
- Progress monitoring procedures





## Why one-on-one instruction for Tier 3?

One on-one-instruction is the cornerstone of Tier 3 intervention. Since children's gaps are different, the more personalized and focused you can make your interventions, the more effective they will be.

Schools implement interventions for many reasons, all of which stem from a particular student or group of students requiring additional support over and above classroom teaching. Sometimes small group instruction just isn't targeted enough at the specific needs of a child.

A recent small-scale evaluation of an elementary math online tutoring program found promising results. Students who received online one-to-one tutoring showed greater gains on a math assessment than those who did not, which compares favorably to effects found by other, in-person elementary math tutoring programs.

ERIC - National Center for Research in Advanced Information and Digital Technologies



"We know one-on-one instruction is the best, and now with Third Space Learning we have 24 tutors working one-on-one with our students at once - we would never have the resources to do that in-house."

Liz Avery, Math Instructional Coach Renaissance Academy Charter School of The Arts

## Evidence-based strategies for Tier 3 instruction

### Self-monitoring problem solving

Self-monitoring means that a student can talk themselves through a problem and think about what they are doing at each step. Students can be taught to ask themselves:

- Oo I understand the question?
- Have I done a problem like this before?
- Can I use a strategy I have used before for this problem?
- If it doesn't work, what else can I try?
- Students may need a checklist of questions to work through until they have mastered the selfmonitoring process.



### Visual guided practice

How it works: Visual guided practice is an instructional approach that provides students with visual aids or supports to help them understand and practice math concepts.

- **Using visual aids:** Diagrams, charts, graphs, manipulatives, or multimedia presentations can all help make abstract math concepts more accessible
- Step-by-step demonstrations: Interventionists can carry out step-by-step demonstrations of problem-solving strategies, modeling how to approach problems
- Guided instruction: Probing questions, prompts, or scaffolding can be used throughout the session to help students apply the visual representations effectively

This instruction can be differentiated to accommodate different learning styles, abilities, and levels of mathematical proficiency.

All Third Space Learning tutors are trained to encourage active learning and promote discussion rather than lecturing, asking pupils to explain their working out or verbalize their reasoning. Involving the pupil in the process of learning promotes a more thorough consolidation of learning and promotes metacognitive development.

### <sup>3</sup> Practice fact retrieval

How it works: To master complex math tasks, students in Tier 3 interventions may need more support building fluent retrieval of basic arithmetic facts. Interventionists can use one or more of the following methods to help this process:

#### Flashcards

- 🤣 Write a math prompt on one side and the answer on the other
- Work through them, putting the correctly answered ones in one pile, and the ones the student didn't know in another pile
- Repeat the process until all contents have been recalled from memory at least once the crucial part is that the unknown ones should be reviewed again

#### Copy-Cover-Compare

- Ask the student to copy math facts or equations from a template
- Cover up the original
- Compare the students' responses on the copy to the original to identify errors



## Example of effective one-on-one instruction

Third Space Learning's intervention curriculum contains lessons mapped to specific diagnosed learning needs. Each lesson uses a scaffolded structure to help students move smoothly from guided to independent practice - at a personalized learning pace!



#### Let's learn

Each tutoring lesson begins by introducing the unit and helping students feel ready to learn



#### You do

A carefully sequenced next question ensures students can apply knowledge to different contexts



#### Follow me + your turn

Students then work through a scaffolded example with their tutor before trying a similar question on their own



#### Go further

This gives students an opportunity to apply their knowledge to problem solving and reasoning questions

One-on-one tutoring is evidenced as one of the most effective interventions to help raise math achievement and accelerate progress. Schools choosing Third Space Learning benefit from one-on-one tutoring for the price many other providers charge for group sessions. Tutoring is offered from just \$16 per session per student, with no set-up costs.



# Practicalities of running math interventions

We've managed math interventions in thousands of schools for 10+ years and we know the challenges school leaders, teachers and interventionists can face in successful implementation of interventions. Here are some final practical considerations, together with recommendations and advice on how Third Space Learning can support you. **1** Staffing

Finding enough qualified staff to implement interventions can be challenging for school districts. It might require the district to train existing staff or hire new personnel.

Third Space Learning tutors provide the focused instruction that some students need to make progress. In doing so, they maximize whole-group time in the classroom by providing individualized support to many students at once, reducing scheduling and staffing issues.

#### 2 Resources

Interventions may require significant resources, including personnel, time, and funding. School districts may struggle to allocate these resources, especially if they are already stretched thin.

Grant opportunities, partnerships and state or federal funding from the US Department of Education can help districts provide the sustained support needed to boost student learning.

73% of schools signed up for Third Space Learning math tutoring are Title I schools, with most schools choosing to prioritize students from low socioeconomic backgrounds. Find out how Third Space Learning can help you maximize your schools funding to implement personalized one-on-one tutoring for underprivileged students.

#### **3** Data collection and monitoring

Collecting and analyzing data to identify student needs and track their progress can be time consuming and complex - adding to teachers' already intense workload.

Each Third Space Learning session is guided by the student's response. Highly trained STEM specialist tutors adapt and personalize one-on-one math instruction to suit the needs of each student. Schools receive a detailed report for each learner after every session, so educators and intervention organizers can quickly and easily track the progress of each student.



#### 4 Scheduling for collaboration

Effective interventions require collaboration among teachers, administrators, counselors, and parents. Scheduling and coordinating meetings can be challenging for school districts.

Conducting a school-wide needs assessment across the district can help to prioritize a commitment to math interventions.

#### 5 Parental involvement

Engaging parents or guardians in interventions is essential, particularly for Tier 2 and Tier 3 interventions. However, communication and collaboration is not always easy, especially with parents and guardians who do not respond to phone calls or emails.

Third Space Learning provides a letter for schools to send to parents covering:

- Who are Third Space Learning?
- How Third Space Learning works
- Safeguarding and quality of teaching
- How to support your child with Third Space Learning

#### **6** Sustainability

Maintaining Tier 3 interventions over time and ensuring their long-term effect can be difficult, especially if there is change to staff, leadership or funding.

Addressing these challenges requires careful planning and a commitment from school districts to make Tier 3 interventions a priority to meet the diverse needs of students.

Reassessing school funding options and existing resources based on data-driven information ensures a more efficient use of financial resources. Reallocating funds and resources as required supports the sustainability of implementing evidence-based interventions.

Third Space Learning: a more affordable approach to scheduled one-on-one math tutoring

We are proud to have provided online one-on-one tutoring to over 160,000+ students across 4,000+ schools since 2013. We'd love to support your school or district. Get in touch today to find out more about how Third Space Learning works and our impact in schools like yours.

## References

<sup>1</sup> <u>https://cfey.org/wp-content/uploads/2021/09/A-Space-for-Maths-Sept-2021-for-</u> publication-amended.pdf	2
<sup>2</sup> <u>https://thirdspacelearning.com/us/blog/response-to-intervention/</u>	3
<sup>3</sup> https://thirdspacelearning.com/us/math-resources/quizzes/	13
Further reading	

https://thirdspacelearning.com/us/blog/tier-1-interventions/ https://thirdspacelearning.com/us/blog/tier-2-interventions/

https://thirdspacelearning.com/us/blog/tier-3-interventions/

https://thirdspacelearning.com/us/blog/response-to-intervention/

https://thirdspacelearning.com/us/blog/mtss-interventions/



## Do you have a group of students who need a boost in math?

Each student could receive personalized lessons every week from our specialist one-on-one math tutors.

Differentiated instruction for each student



Aligned to your state's standards



Scaffolded learning to close gaps

93% of teachers feel Third Space Learning lessons helped their pupils achieve higher assessment scores!

## Speak to us



thirdspacelearning.com/us/





