

Tier 3 Problem Solving Case Study: 4th Grade Math

School

Sunshine Grove Elementary School serves 478 students in grades K-5. The classrooms are bright, welcoming and filled with colorful artwork and student projects. Teachers are dedicated, passionate about their profession and use innovative teaching methods to meet the unique needs of each student. They incorporate a variety of evidence-based strategies and activities to ensure that every child progresses toward grade-level standards. The curriculum is knowledge-rich and engaging, with a strong emphasis on both academic excellence and resiliency. The demographic profile for Sunshine Grove Elementary School is below.



[PORTAL HOME](#)

[REPORT CARDS](#)

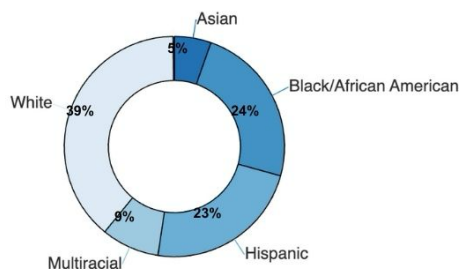
[STRATEGIC PLAN](#)

[CLOSING THE GAP](#)

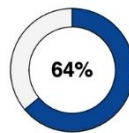
[ADVANCED REPORTS](#)

[RESOURCES](#)

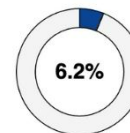
Race/Ethnicity



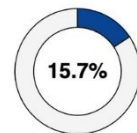
Economically Disadvantaged



Current English Language Learners



Students with Disabilities

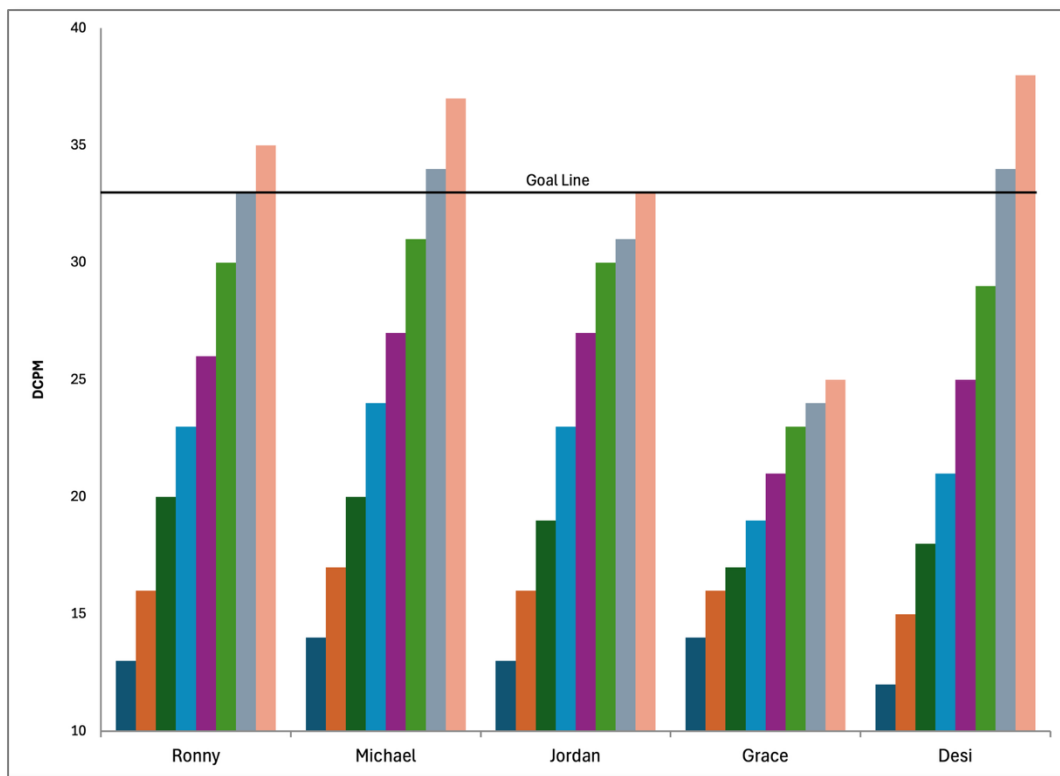


Grade Level

All grade-level teams at Sunshine Grove Elementary participate in weekly Professional Learning Community (PLC) meetings, with a shared mission to enable all students to achieve or exceed grade-level expectations. Each PLC includes general education teachers, ESE teachers, instructional coaches and other intervention providers. Staff members share the belief that every educator is a valuable, contributing team member, and that all tiered instruction and supports should be integrated and standards-aligned. Following the first universal screening of the school year, the 4th grade team met to review and discuss math data. They used the screening data to determine students' progress toward end-of-year standards and to identify students who may benefit from intervention.

During a review of FAST Math PM 1 data and Fall iReady Diagnostic Report data, the PLC identified students who would benefit from supplemental (Tier 2) instruction. Based on the available data, the team observed common skill gaps among the students and grouped them based on similar needs. Utilizing the school's resource map for math interventions, they selected Fraction Face-Off! for a group of students who performed below expectations in understanding the relationship between fractions and decimals and initiating operations with both. Fraction Face-Off! focuses on comparing, ordering, placing fractions on number lines, and understanding equivalencies. The intervention provider, Ms. Chieng, met with the group of students three times per week for 30 minutes per session during the 4th grade Intervention/Enrichment block. Student progress was monitored using a math curriculum-based measurement. After eight weeks, the PLC met to

review the data for all supplemental intervention groups. The progress monitoring data for the group receiving the Fraction Face-Off! intervention is below.



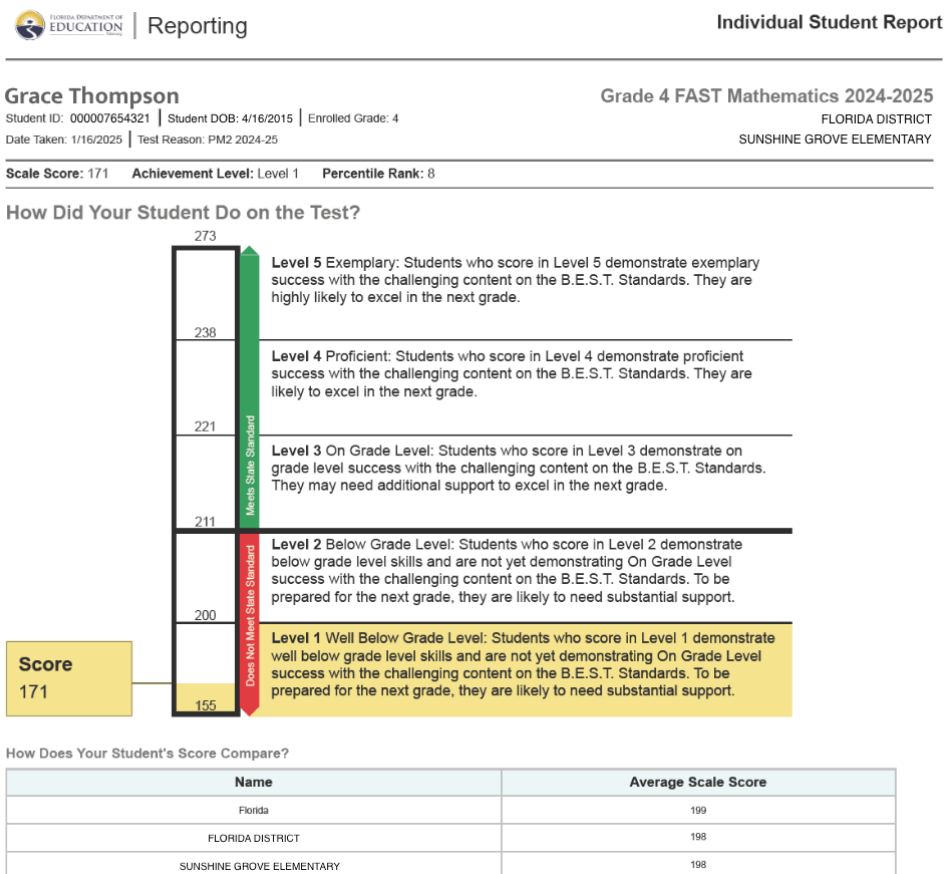
During this meeting, Ms. Chieng shared the progress of the students in her group based on her observations of student performance, intervention fidelity data, and the curriculum-based measurement data. The team noted that Grace's response to Tier 2 interventions was poor, despite the intervention being effective for the majority of the intervention group. They reviewed fidelity data and found that all students, including Grace, were present for the same amount of time during the intervention. Given that her progress was significantly lower than the others in her small group, the team agreed that considering Tier 3 support for Grace was justified. Based on this data review and corroborating classroom data from the classroom teacher, Mr. Klepper, Grace is one of a few 4th grade students who will be discussed further at an upcoming individual student problem-solving meeting to determine how to intensify supports.

Individual Student Problem Solving Team Meeting

Step 1: Goal Identification (Problem Identification)

Mr. Klepper and Ms. Chieng met with the instructional coach and school psychologist to engage in individual student problem-solving to discuss the best way to support Grace in math. The team reviewed the following data for Grace:

Florida Assessment of Student Thinking (FAST)



iReady Diagnostic (Winter)

Expected Level of Performance: 482 scale score

Current Level of Performance: 405 scale score (3 or more grade levels below)

Peer Level of Performance: 77% of Grace's peers are performing at the expected level

Math Computation Single Skill Measurement (Fractions) (Progress monitoring data collected for all students in the Tier 2 intervention group.)

Expected Level of Performance: 33 digits correct

Current Level of Performance: 25 digits correct

Peer Level of Performance: 80% of Grace's Tier 2 peer group performed at the expected level

Since the team identified a significant discrepancy between Grace's performance and the expected level, and a gap between her performance and that of her peers, they felt confident proceeding to the next step of the problem-solving process. Step 2, Problem Analysis, will help the team better understand why Grace's math skills are significantly below expectations.

Step 2: Problem Analysis

To begin problem analysis, the team generated hypotheses or “educated guesses” across multiple educational domains (i.e., ICEL: instruction, curriculum, environment and learner) to explain why the problem was occurring. They were careful to focus on alterable variables that were specific, observable and measurable and would lead to intervention. For each hypothesis they identified what information they had, or would need to collect, to validate or confirm the hypothesis.

The team generated a hypothesis within the domain of *instruction*:

Grace is not meeting grade level expectations in math because... *the instruction does not include adequate concrete and semi-concrete representations with sufficient opportunities to practice connecting concrete and semi-concrete representations to abstract representations.*

To confirm or rule out the hypothesis, the team reviewed lesson plans and interviewed the teacher for evidence of instruction that included concrete and semi-concrete (pictorial) representations and opportunities to practice connecting them to abstract representations.

It was determined that although instruction included some opportunities to use semi-concrete (pictorial) representations, there were very few concrete representations as well as few opportunities to connect concrete representations to abstract representations. Therefore, the team concluded that this was a **valid** hypothesis.

The team generated a hypothesis within the domain of *curriculum*:

Grace is not meeting grade level expectations in math because... *the scope and sequence of the curriculum did not allow for adequate instruction and practice on the relationship between decimals and fractions and how they can be converted reciprocally (MA.4.FR.1.2).*

To confirm or rule out the hypothesis, the team reviewed the pacing guide to determine the degree to which Grace and her 4th grade peers had been taught the relevant decimal and fraction concepts.

Based on their review, they noted that the curriculum had a spiral design wherein the concepts had been taught and revisited multiple times at increasing levels of complexity. The team, therefore, determined that the hypothesis was **not valid**.

The team generated a hypothesis in the domain of *environment*:

Grace is not meeting grade level expectations because... *the environment is too distracting and lacks the structure and instructional routines necessary to sustain Grace’s engagement in the lesson.*

To confirm or rule out the hypothesis, Mr. Stewart observed Grace during Tier 1 instruction and during the Tier 2 intervention session for evidence of distractions and instructional routines.

Mr. Stewart observed that Mr. Klepper’s classroom was free of distractions during Tier 1 whole group and differentiated instruction and that there was clear evidence of classroom management and instructional routines, (e.g., rules for speaking during whole group discussion, routines for differentiated instruction group transitions and participation). Grace looked directly at Mr. Klepper while he taught the lesson, she asked questions and volunteered multiple times to help demonstrate and model concepts. Mr. Stewart noted that during the Tier 2 intervention, Grace focused on Ms. Chieng, followed directions, asked questions and requested assistance as needed. Given the findings from the observation, the team concluded that the hypothesis was **not valid**.

The team generated a hypothesis in the domain of *learner*:

Grace is not meeting grade level expectations because... *she lacks the pre-requisite knowledge of equivalent fractions (MA.3.FR.2.2, MA.2.FR.1.1 and MA.2.FR.1.2).*

To confirm or rule out the hypothesis, the team reviewed data from previously administered assessments and classroom work samples to determine if Grace had the pre-requisite skill.

Unit assessments and works samples indicated that Grace was not able to identify fractions of equal value. The hypothesis was determined to be **valid**.

Through problem analysis, the team was able to validate the following hypotheses to explain Grace's underperformance in math:

- Grace is not meeting grade level expectations in math because she has not received sufficient instruction on concrete and semi-concrete (pictorial) representations or sufficient opportunities to practice connecting concrete and semi-concrete representations to abstract representations.
- Grace is not meeting grade level expectations in math because she lacks the pre-requisite knowledge of equivalent fractions (MA.3.FR.2.2).

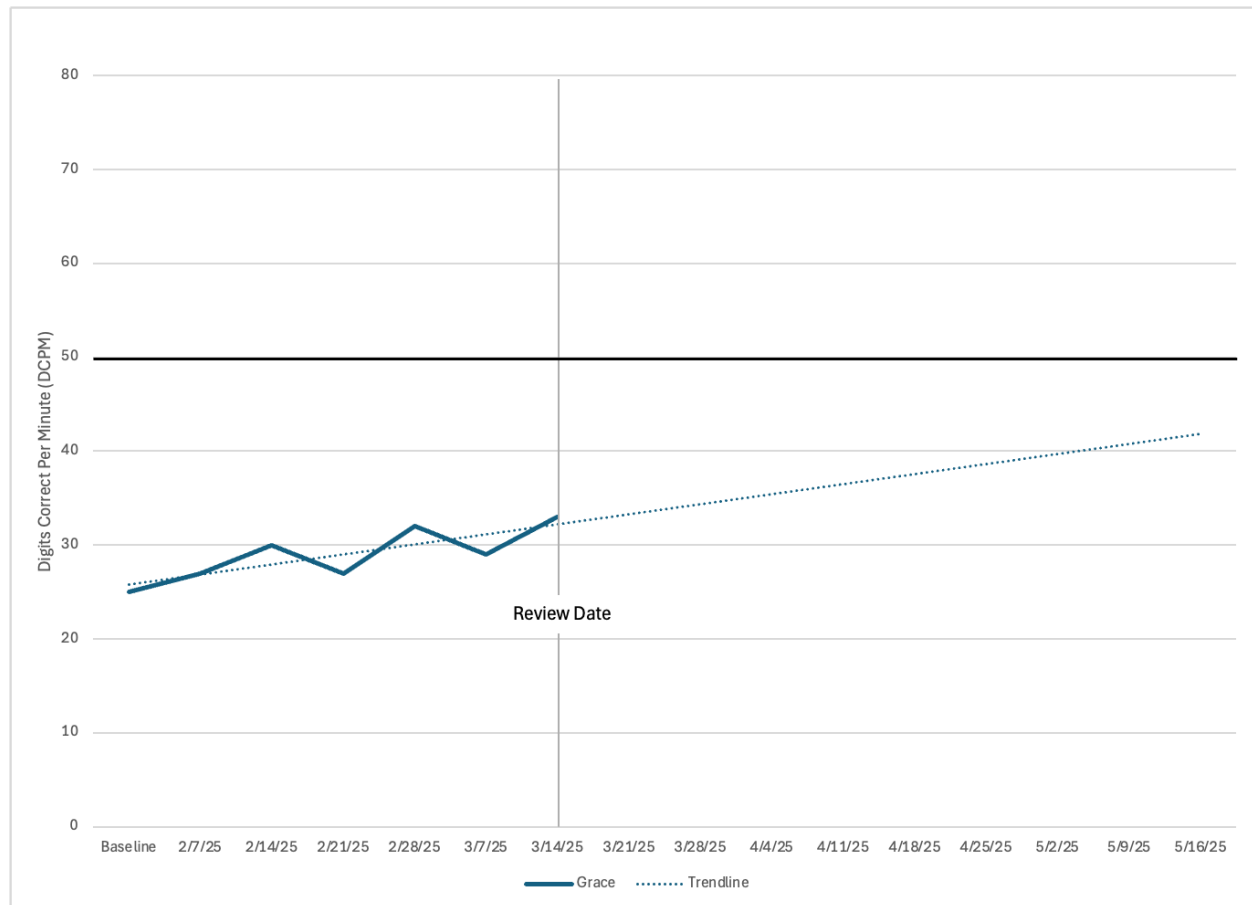
Step 3: Intervention Design and Implementation

The team established an ambitious, realistic goal for Grace based on her current level of performance. Considering the validated hypotheses, specific evidence-based strategies were selected to provide instruction using concrete and semi-concrete representations to address Grace's skill gaps, including knowledge of equivalent fractions. Since the instructional protocol was new to Ms. Chieng, the team planned a demonstration, practice, and feedback cycle to support her implementation of the intervention. This more intensive, individualized intervention will be provided to Grace in addition to core and supplemental intervention and is detailed in the table below:

Goal: By May 20, 2025, Grace will complete 50 digits correct per minute (DCPM) on a math CBM probe.			
Intervention Plan	Support Plan	Fidelity Documentation	Progress Monitoring Plan
Who is responsible? Ms. Chieng What will be done? 1. Show Grace concrete and semi-concrete (pictorial) representations (e.g., visual models of circles/rectangles) that illustrate equivalent fractions, and other prerequisite fraction concepts and procedures. Ensure representations most accurately model the concept or procedure being addressed. 2. Connect the concrete and semi-concrete (pictorial) examples to the mathematical notation. 3. Provide Grace with multiple opportunities to practice these examples to reinforce her understanding. When will it occur? Daily 10:30 – 10:45 Where will it occur? Ms. Chieng's classroom	Who is responsible? Mr. Stewart What will be done? Provide concrete representations (e.g., fraction bars, fraction tiles, fraction circles) to Ms. Chieng with information on which ones most accurately model various concepts or procedures When will it occur? 1/31 Where will it occur? Ms. Chieng's classroom Additional support plan, if needed: Who is responsible? Mr. Stewart What will be done? Model lesson format outlined in intervention plan When will it occur? 2/3 and 2/4 at 10:30am Where will it occur? Ms. Chieng's classroom	Who is responsible? Ms. Chieng What will be done? Complete attendance sheet When will it occur? Daily during intervention How will data be shared? Upload to SharePoint Additional fidelity documentation plan, if needed: Who is responsible? Mr. Stewart What will be done? Observe intervention lesson and provide feedback When will it occur? 2/5 and 2/6, then every 2-3 weeks as needed How will data be shared? Feedback provided immediately following lesson	Who is responsible? Ms. Chieng What data will be collected and when? Math CBM collected weekly on Fridays When will the team reconvene to evaluate progress? 3/18 at 2:00pm How will we decide if the plan is effective? Review of Math CBM trend data, using the following decision rules: Positive RtI ≥ 35 DCPM Questionable RtI 30-34 DCPM Poor RtI ≤ 29 DCPM

Step 4: Response to Instruction/Intervention

The team reconvened after six weeks of intervention implementation to discuss Grace's progress. They reviewed the progress monitoring data (graph below) and considered the predetermined decision rules (Positive RtI: ≥ 35 DCPM, Questionable RtI: 30-34 DCPM, Poor RtI: ≤ 29 DCPM).



Based on the decision rules and a review of the trendline, the team determined that Grace demonstrated a questionable response to intervention. This was evidenced by the trendline falling between the 30-34 DCPM at the time of review as well as a visual analysis of the graph that indicated the gap between Grace's performance and the goal was closing, but not a rate that would allow her to meet the goal set for May. Given the questionable response, the team first reviewed fidelity data.

According to the attendance data (see below), Grace participated in 94% of the intervention sessions. Observational data confirmed that, after initial corrective feedback, all components of the intervention were implemented as designed.

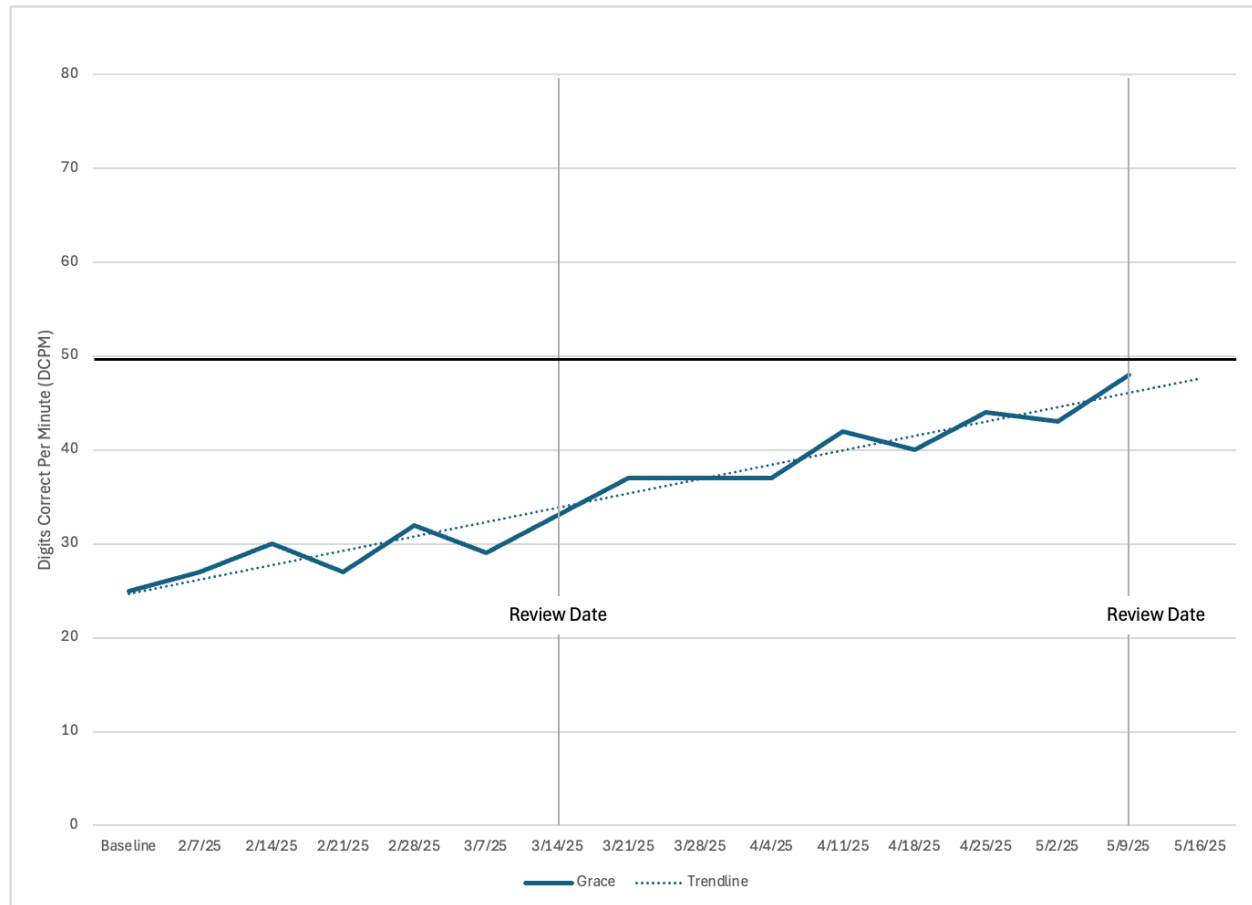
Intervention Attendance Sheet					
Student: Grace Thompson		Date range: Feb. 3 – Mar. 18, 2025			
Intervention: Provide concrete and semi-concrete representations of equivalent fractions; connect to examples and provide multiple practice opportunities. Intervention is implemented daily for 15 min.					
Intervention Provider: Ms. Chieng					
Directions: Initial dates when student is present. Indicate “absent” if the student did not receive the intervention. Include relevant notes in space provided below.					
Week of	Mon.	Tue.	Wed.	Th.	Fri.
2/3	HC	HC	HC	HC	HC
2/10	HC	HC	HC	HC	HC
2/17	HC	HC	HC	Absent	Absent
2/24	HC	HC	HC	HC	HC
3/3	HC	HC	HC	HC	HC
3/10	HC	HC	HC	HC	HC
3/17	HC	HC	Team reconvenes on 3/18		
Notes:					
Mr. Stewart modeled lesson on Feb 2 and 3					
2/20 Grace wasn't feeling well. I sent her to the clinic after the first 5 minutes of the session					
2/21 Grace out sick					

Intervention Observation Checklist				
Intervention focus: Equivalent fractions and other pre-requisite skills using concrete and semi-concrete representations; connecting to examples and providing multiple practice opportunities.				
Student: Grace Thompson		Intervention Provider: Ms. Chieng		
Observer: Mr. Stewart				
Directions: Record the date of each observation in the appropriate row. Indicate "+" if intervention component is observed and "-" if intervention component is not observed. Record any relevant notes from session.				
Intervention Component				
	1. Models concept using concrete/semi-concrete materials	2. Connects concrete & semi-concrete examples to abstract representation (e.g., math notation)	3. Facilitates student practice	4. Provides immediate feedback to student
Date: 2/5	+	-	+	-
Notes: Reviewed with Ms. Chieng how to explicitly connect the semi-concrete/concrete examples to abstract representation. Reviewed the provision of immediate, specific feedback in response to correct/incorrect student practice attempts.				
Date: 2/6	+	+	+	+
Notes: Noted improvements connecting semi-concrete and concrete examples to abstract. Feedback was consistent and timely. Will observe again in two weeks.				
Date: 2/20	+	+	+	+
Notes: All intervention components present. Provided accurately with high quality. Next observation in three weeks.				
Date: 3/13	+	+	+	+
Notes: Fidelity looks good. Ensured Ms. Chiang had all fidelity observation data needed for upcoming meeting on 3/18.				

Since the intervention was implemented with fidelity and Grace was showing some progress, the team agreed to continue the current approach, adjusting the duration of the intervention sessions from 15 to 20 minutes to enhance its effectiveness. The additional 5 minutes per session would allow Grace more opportunities to practice the concepts and receive feedback from Ms. Chieng. The team planned to meet again on 5/13. To ensure Grace stays on track to meet the goal of completing 50 digits correct per minute by May 20, the team will use the following decision rules during the next review meeting: Positive RtI: ≥ 48 DCPM; Questionable RtI: 37-47 DCPM; Poor RtI: ≤ 36 DCPM.

Tier 3 Problem Solving Case Study: 4th Grade Math

After an additional seven weeks of intervention implementation, the team reconvened on 5/13 to review the progress monitoring data (see graph below).



Based on the predetermined decision rules (Positive RtI: ≥ 48 DCPM, Questionable RtI: 37-47 DCPM, Poor RtI: ≤ 36 DCPM) and a review of the trendline indicating the gap was closing at a rate that would meet the goal, the team determined that Grace's response to intervention was positive. The team decided they would continue the intervention as designed for the remaining two weeks of school. Further, knowing that the standards would evolve in the following year to include addition and subtraction with unlike denominators, they planned to meet with Grace's 5th grade teacher to provide detailed information on the evidence-based interventions that effectively increased Grace's understanding of fractions.