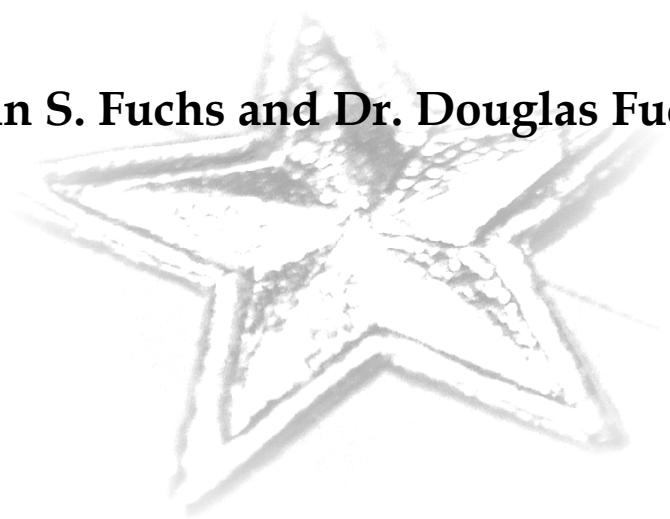


PROGRESS MONITORING IN THE CONTEXT OF RESPONSIVENESS-TO- INTERVENTION

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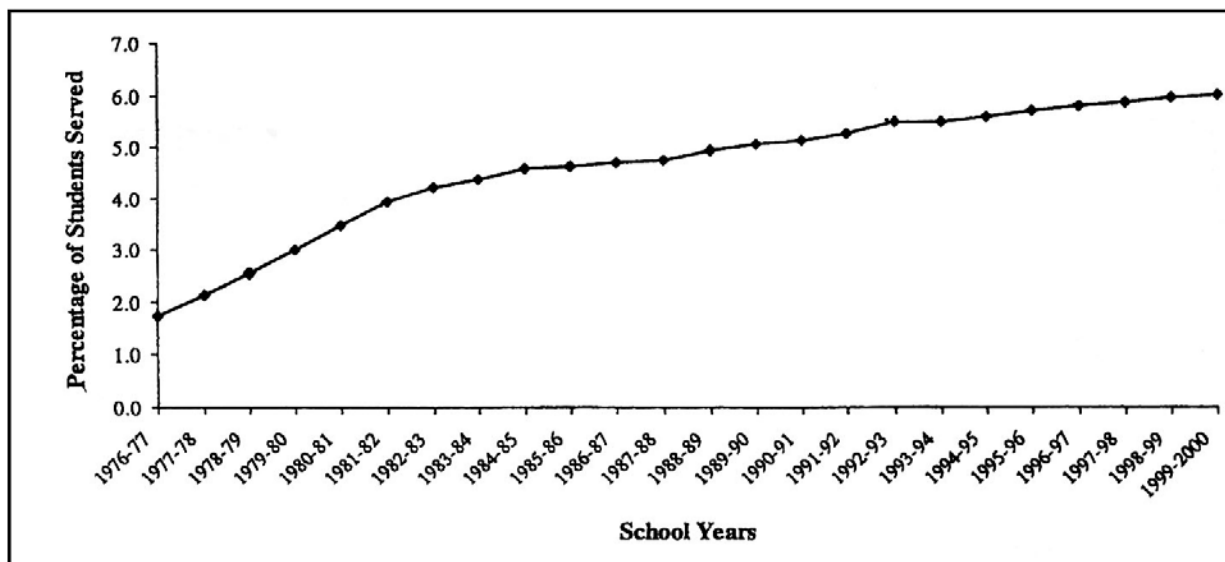
What Is Responsiveness-to-Intervention?

The Individuals with Disabilities Education and Improvement Act (P.L. 108-446; IDEA 2004) cited two methods for identification of students with learning disabilities (LDs). The first method is the traditional IQ/achievement discrepancy. The second method encourages special education practitioners to use a “responsiveness-to-intervention,” or RTI, as a new, alternative method of LD identification.

Why Use RTI Instead of the Traditional IQ/Achievement Discrepancy?

The Education of All Handicapped Children Act (1975) defined “underachievement” as a discrepancy between IQ and achievement. For many years, the IQ/achievement discrepancy was the main method for identifying students with LDs. Figure 1 shows the increase in students identified with LDs over a 25-year span. The traditional IQ/discrepancy method may identify too many students, and the overidentification of students is costly for schools.

Figure 1: Percentage of Students With LD (Ages 6–21) in the General Population From 1976–1977 to 1999–2000



The IQ/achievement discrepancy is criticized for several reasons. First, IQ tests do not necessarily measure intelligence. If IQ cannot be measured precisely, then a discrepancy between IQ and achievement may not be accurate. Second, IQ and academic achievement are not independent from one another, and so difference scores are unreliable. Third, students must fail before they are identified with LDs, with most students identified between grades 3 and 5. Waiting to identify students in the late elementary grades causes students to fall even further behind their peers.

The alternative RTI method looks at student unresponsiveness to otherwise effective instruction. It requires that special education be considered only when a student's performance

reveals a dual discrepancy: The student not only performs below the level demonstrated by classroom peers, but also demonstrates a learning rate substantially below that of classmates.

RTI considers the fact that educational outcomes differ across a population of learners, and a low-performing student may ultimately perform less well than his or her peers. All students do not achieve the same degree of academic competence. Just because reading or math growth is low, it does not mean the student should automatically receive special education services.

If a low-performing student is learning at a rate similar to the growth rate of other students in the same classroom environment, he or she is demonstrating the capacity to profit from the educational environment. Additional intervention is unwarranted. However, when a low-performing student is not manifesting growth in a situation where others are thriving, consideration of a special intervention is warranted. Alternative instructional methods must be tested to address the apparent mismatch between the student's learning requirements and those represented in the conventional instructional program.

RTI identifies students as LD when their response to educational intervention is dramatically inferior to that of peers. The idea is that students who respond poorly to otherwise effective instruction have a disability that limits their response to conventional instruction and instead require specialized treatment to affect schooling outcomes associated with success in life.

Advantages of RTI

One main advantage of RTI is that students are identified as LD only after they have not responded to instruction that is effective for the vast majority of students. RTI eliminates poor instructional quality as an explanation for a student's poor academic performance.

Another advantage of RTI is that students are provided with early intervention. RTI does not wait for students to fail. RTI provides many students with the opportunity to receive quality educational interventions that allow them to close the gap between them and the rest of their peers.

RTI is also advantageous because assessment data are collected frequently to inform the teacher of student performance and to decide which tier of instruction is appropriate for students. Frequent data collection also helps the teacher improve instruction.

Basics of RTI

RTI uses response to intervention, at various tiers, to identify students with LDs. Students are provided effective instruction in the general education setting, referred to as "primary prevention" or Tier 1 intervention. Students suspected of being at risk are identified by a percentile cutoff on a screening measure: a norm-referenced test or a cutoff point on a curriculum-based measurement (CBM) test. The suspected at-risk students are assessed using progress monitoring (PM). Students unresponsive to primary prevention receive research-based preventative treatment, usually small-group tutoring, during which progress is monitored frequently. This tutoring is referred to as "secondary prevention" or Tier 2 intervention.

Responsiveness-to-treatment is determined using final status on a norm-referenced test, using a CBM benchmark, and/or considering the amount of progress realized during secondary prevention. Students who are responsive to secondary treatment are deemed disability-free and returned to the general education setting. Students who are unresponsive to secondary treatment are considered for special education services, referred to as “tertiary prevention” or Tier 3.

Tertiary prevention takes place under the auspices of special education. During Tier 3, student individualized education plan (IEP) goals are established, individualized student programs are developed, and student progress is monitored to determine effectiveness of instructional programs and/or to decide when a student may move back into secondary or primary prevention.

How RTI Will Be Operationalized in This Manual

The number of tiers for RTI varies from model to model. In this manual, the most widely researched three-tier model will be highlighted. Tier 1, or primary prevention, takes place in the general education classroom. During primary prevention, effective research-based interventions are faithfully implemented in the classroom. These interventions work for the vast majority of students. Students are screened at the beginning of the year to determine who is suspected of being at risk.

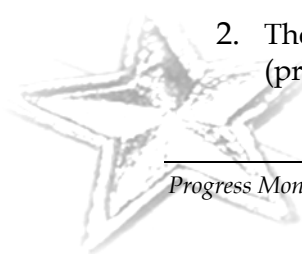
To avoid missing any students who will eventually develop problems, a wide net is cast whereby the lowest half of the student body is identified from screening (a one-time, brief test) to weekly progress monitoring. Students whose progress across the next 6–10 weeks of primary prevention in general education is below a cut-off point are determined to be at risk for poor learning outcomes and enter Tier 2, or secondary prevention.

Secondary prevention involves small-group preventative tutoring. The tutoring in secondary prevention is viewed as a test to which at-risk students do or do not respond to determine disability. This tutoring relies on validated research-based programs, and student progress is assessed weekly.

Students (a) who complete secondary prevention at a high enough adequate level and (b) who make progress during secondary prevention, as evidenced by the weekly progress monitoring, are deemed as “responsive” to the secondary prevention tutoring. These students move back into Tier 1, or primary prevention. Students who are “unresponsive” (i.e., who do not achieve adequate final performance or progress during second prevention) are suspected as having a learning disability. These students move into Tier 3, or tertiary prevention, which involves special education resources.

Typical RTI procedure is the following:

1. All students in a class, school, or district are screened (i.e., tested) once in the fall to identify students “suspected” of being at risk for long-term difficulties.
2. The progress of these students suspected to be at risk is monitored in general education (primary prevention) to confirm risk because these students’ needs are not being met in



general education. Therefore, these students require more intensive tutoring (Tier 2, or secondary prevention).

3. For the at-risk students, research-validated Tier 2 (secondary prevention) tutoring is implemented. Student progress is monitored throughout the intervention, and students are also assessed at the end of intervention.
4. Students who do not respond to the secondary prevention, as indicated by (a) not completing secondary prevention at a high enough adequacy level, and (b) not progressing enough during secondary prevention as evidenced by the weekly progress monitoring, receive a comprehensive evaluation to answer questions generated during primary and secondary prevention and for possible disability certification (LD, BD, or MR) and special education placement.
5. Progress is monitored during tertiary special education to (a) set IEP goals, (b) indirectly formulate effective individualized programs, and (c) define responsiveness-to-intervention in tertiary special education in order to formulate ideas about when to exit students from special education.

Progress Monitoring

Progress monitoring (PM) is a vital aspect of the RTI model. During PM, teachers assess students' academic performance using brief reading or math measures. PM takes place frequently (weekly or biweekly), and each alternate test form assesses performance of what is expected at the end of the school year. The score on the PM measure is viewed as an indicator of overall student performance.

How PM Will Be Operationalized in this Manual

In this manual, PM will be operationalized through the use of curriculum-based measurement (CBM).

- CBM benchmarks will be used for screening and identifying students suspected to be at risk.
- CBM slope will be used to confirm or disconfirm actual risk status by quantifying short-term response to general education primary prevention across 6–10 weeks.
- CBM slope and final status will be used to define responsiveness-to-intervention to secondary preventative tutoring.
- CBM slope and final status will be used to:
 - a. Set IEP goals.
 - b. Indirectly formulate effective individualized programs.
 - c. Define responsiveness-to-intervention to tertiary special education in order to formulate decisions about when to exit students from special education.

Basics of CBM

CBM is used to assess students' academic competence at one point in time (as in screening or determining final status following intervention) and to monitor student progress in reading and math. CBM has been researched for more than 30 years. CBM is used across the country, and it demonstrates strong reliability, validity, and instructional utility. CBM produces accurate, meaningful information about students' academic levels and their rates of improvement, and CBM corresponds well with high-stakes tests. When teachers use CBM to inform instructional decisions, students achieve better.

To assess student performance at one point in time, two alternate forms of CBM are administered in the same sitting, and the average score is computed. For example, a teacher is using CBM Passage Reading Fluency to assess the performance of her third-grade students in September. The third-grade cut-off point to determine reading risk is a student reading fewer than 50 words a minute.

Student Alex scores 52 on the first CBM test and 38 on the second CBM test. His average would be $(52 + 38 = 90) \div 2 = 45$. Since Alex's average score of 45 falls below the cut-off of 50, he would be suspected of being at risk for reading difficulties.

Student Florence's scores on two CBM tests are 49 and 57. Her average would be $(49 + 57 = 106) \div 2 = 53$. Since Florence's average score is above the cut-off of 50, she would not be suspected of being at risk for reading difficulties.

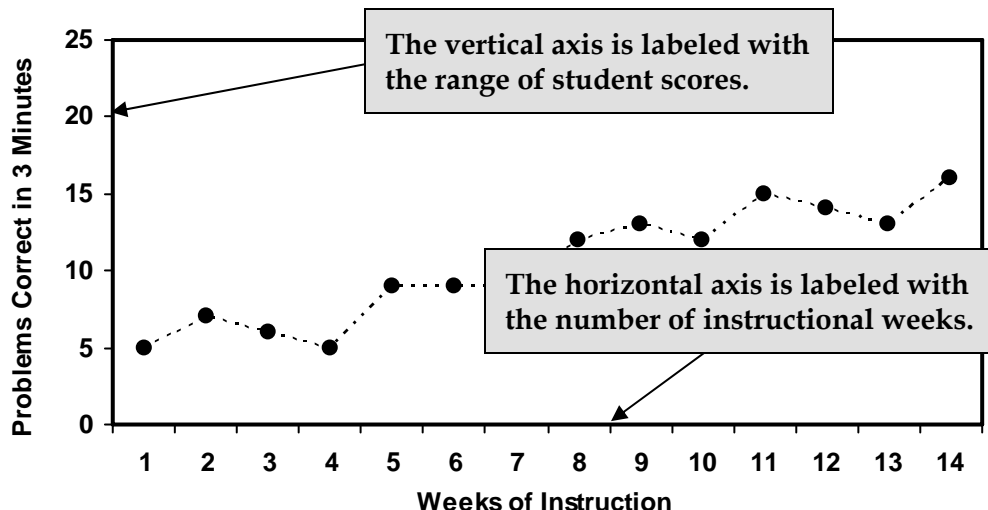
Graphing CBM Scores

To monitor progress, each student suspected of being at risk is administered one CBM alternate form each week, and the student's scores are charted on a graph. With CBM graphs, the rate at which students develop academic performance over time can be quantified. Increasing scores indicate the student is responding to the instructional program. Flat or decreasing scores indicate the student is not responding to the instructional program, and a change to the student's instruction needs to take place.

Graphing CBM scores is easy on teacher-made graphs. Teachers create individual student graphs to interpret the CBM scores of every student and see progress or lack thereof. Alternatively, teachers can use software to handle graphs and data analysis.

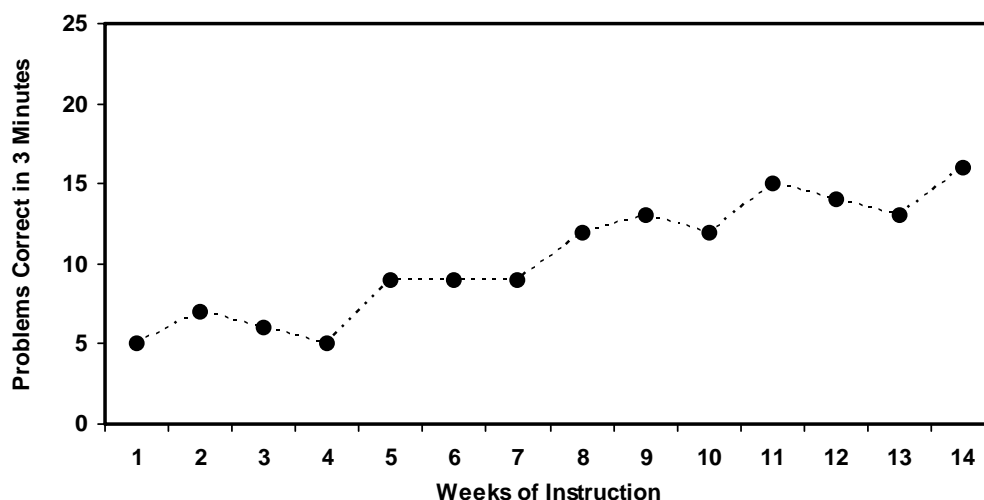
Teachers should create a master CBM graph in which the vertical axis accommodates the range of the scores of all students in the class, from zero to the highest possible CBM score. On the horizontal axis, the number of weeks of instruction is listed. (See Figure 2.) Once the teacher creates the master graph, it can be copied and used as a template for every student.

Figure 2: Sample CBM Template



Every time a CBM probe is administered, the teacher scores the probe and then records the score on a CBM graph. (See Figure 3.) A line can be drawn connecting each data point.

Figure 3: Sample CBM Graph



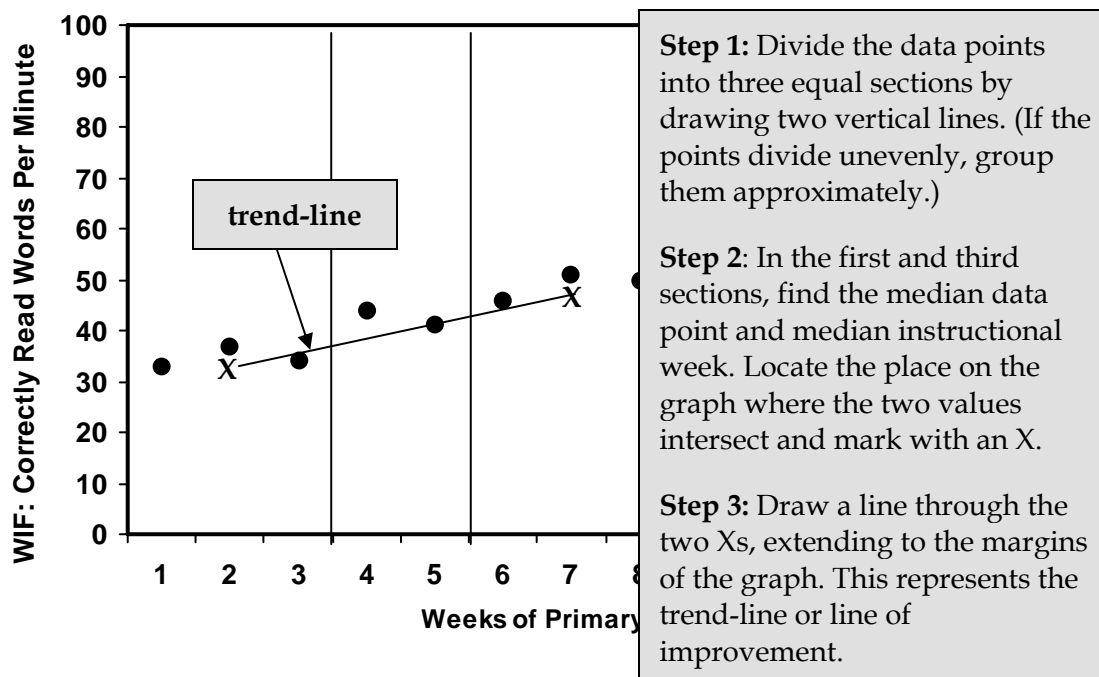
Calculating Slope

Calculating the slope of a CBM graph is important to assist in determining student growth during primary, secondary, and tertiary prevention. First, graph the CBM scores. (See Figure 4.) Then, draw a trend-line using a procedure called the Tukey method and calculate the slope of the trend-line. Follow these steps for the Tukey method (Hutton, Dubes, & Muir, 1992).

1. Divide the data points into three equal sections by drawing two vertical lines. (If the points divide unevenly, group them approximately.)

2. In the first and third sections, find the median data point and CBM week. Locate the place on the graph where the two values intersect and mark with an X.
3. Draw a line through the two Xs.

Figure 4: Drawing a Trend-Line Using the Tukey Method



The slope is calculated by first subtracting the median point in the first section from the median point in the third section. Then, divide the minuend by the number of data points minus 1.

$$\frac{3^{\text{rd}} \text{ median} - 1^{\text{st}} \text{ median}}{\# \text{ of data points} - 1}$$

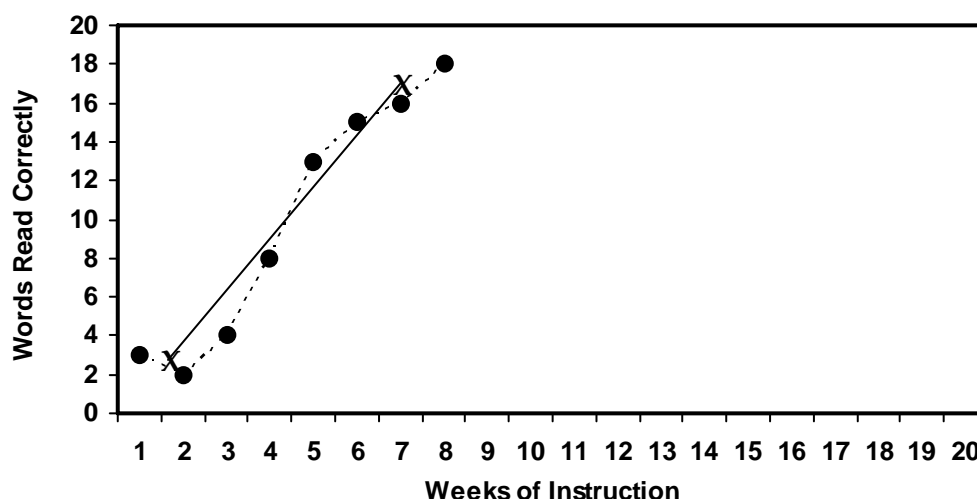
For example, in Figure 4, the third median data point is 50, and the first median data point is 34. The total number of data points is 8. So, $(50 - 34) \div 7 = 2.3$. The slope of this graph is 2.3.

The next few figures show how CBM scores are graphed and how decisions concerning RTI can be made using the graphs.

Look at Figure 5. First-grade student, Sarah, was suspected of being at risk for reading difficulties after scoring below the CBM Word Identification Fluency (WIF) screening cut-off. Her progress in primary prevention was monitored for 8 weeks. Sarah's progress on the number of words read correctly looks like it's increasing, and the slope is calculated to quantify the weekly increase and to confirm or disconfirm at-risk status.

Sarah's slope is $(16 - 3) \div 7 = 1.9$. Her slope is above the first-grade cut-off of 1.8 for adequate growth in general education. Sarah is benefiting from the instruction provided in primary prevention, and she does not need secondary prevention at this time.

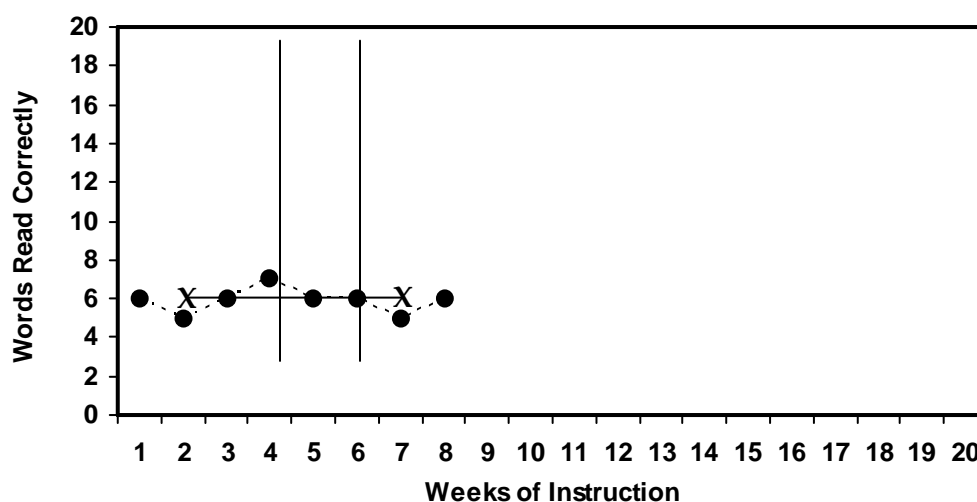
Figure 5: Sarah's Progress on Words Read Correctly—Primary Prevention



Look at Figure 6. Jessica is also a first-grade student who was suspected of being at risk for reading difficulties after scoring below the CBM Word Identification Fluency screening cut-off point in September. After monitoring her progress for 8 weeks, Jessica's scores on the number of words read correctly are not increasing.

Jessica's slope is $(6 - 6) \div 7 = 0$. Her slope is not above the first-grade cut-off of 1.8 for adequate progress in general education. Jessica needs secondary intervention at this time.

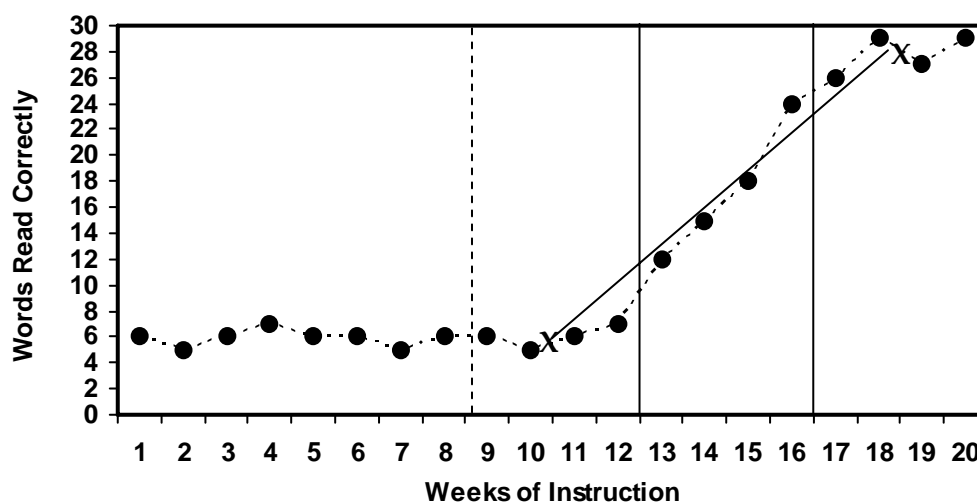
Figure 6: Jessica's Progress on Words Read Correctly—Primary Prevention



Look at Figure 7. Jessica has completed 12 weeks of secondary prevention tutoring. Her progress has been monitored weekly. The dotted line on the graph is drawn at the point that Jessica left primary prevention and entered secondary prevention. Over 12 weeks of tutoring, Jessica's scores are increasing.

Jessica's slope is calculated as $(28 - 6) \div 11 = 2.0$. Her slope is above the first-grade cut-off of 1.8 for growth in secondary prevention. Jessica can exit secondary prevention at this time and go back to general education.

Figure 7: Jessica's Progress on Words Reading Correctly—Secondary Prevention

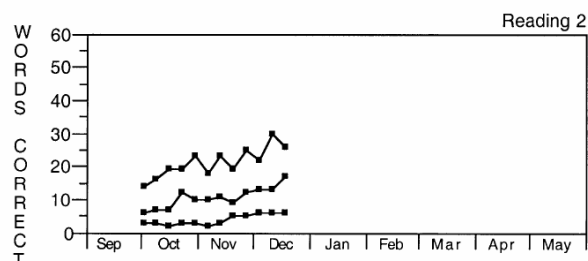


If all students are monitored in primary prevention using CBM, the following figures show some of helpful information that can be obtained from a CBM software package. Figure 8 graphs the progress of lower-, middle-, and higher-performing students. This report also gives teachers a list of students (bottom 25%) to watch.

Figure 8: Sample CBM Class Report—Page 1**CLASS GRAPH**

School: Westgate
Teacher: Smith
12/20/03

Class Report
Page 1

Students to Watch (lowest 25%):

Michael Cox
David Perry
Alan Craig
LaShonda Jones
Carson Wilkins
Dana Sommers

The second page of the CBM class report (Figure 9) provides teachers with a list of each student's CBM Maze Fluency raw score, the percentage of words read correctly, and the slope of each student's CBM graph.

Figure 9: Sample CBM Class Report—Page 2**RANKED SCORES**

School: Westgate
Teacher: Smith
12/20/03

Class Report
Page 2

<u>Name</u>	<u>Score</u>	<u>Percent</u>	<u>Slope</u>
Jason Dunning	37	100%	+1.44
Katherine Rogers	33	94%	+1.57
Lee Tang	26	98%	+0.96
Andy Farrell	25	98%	+1.72
Stephanie Sampras	21	98%	+1.17
Julie Page	20	98%	+1.36
William Curtis	18	95%	+0.91
Jimmy Smithson	18	90%	+0.53
Caleb Jacobs	18	92%	+0.77
Eddie Danforth	15	91%	+0.82
Meagam MacKenzie	13	84%	+0.88
Adrian Alexander	12	81%	+0.35
Bryan Gunter	11	96%	+0.74
Kai-Yun Nguyen	10	70%	+0.49
Brad Williams	10	78%	+0.70
Shawn Brooks	9	73%	+0.56
Mark Mason	7	71%	-0.09
Alex Davis	7	100%	+0.48
Michael Cox	7	82%	+0.60
David Perry	6	86%	+0.48
Alan Craig	6	71%	+0.31
LaShonda Jones	5	65%	-0.20
Carson Wilkins	4	80%	+0.11
Dana Sommers	3	64%	+0.05

This third page of the CBM class report (Figure 10) provides teachers with an average of the students in the classroom and identifies students who are performing below their classroom peers both in terms of the level (score) of their CBM performance and their rate (slope) of CBM improvement.

Figure 10: Sample CBM Class Report—Page 3

CLASS STATISTICS		Class Report Page 3
School: Westgate		
Teacher: Smith		
12/20/03		
Score		
Average score	14.5	
Standard deviation	9.2	
Discrepancy criterion	5.3	
Slope		
Average Slope	+0.70	
Standard deviation	0.50	
Discrepancy criterion	+0.20	
Students identified with dual discrepancy criterion		
	<u>Score</u>	<u>Slope</u>
Carson Wilkins	4.0	+0.11
Dana Sommers	3.5	+0.05

Basics of Reading CBM

From kindergarten through sixth grade, four reading CBM tasks can be used for progress monitoring. Recommendations for each grade level are in Figure 11.

Figure 11: Reading CBM Recommendations by Grade

Grade	CBM Measure
Kindergarten	Letter Sound Fluency Initial Sound Fluency Phoneme Segmentation Fluency
Grade 1	Word Identification Fluency Nonsense Word Fluency + Passage Reading Fluency
Grade 2	Passage Reading Fluency
Grade 3	Passage Reading Fluency
Grade 4	Maze Fluency
Grade 5	Maze Fluency
Grade 6	Maze Fluency

For Passage Reading Fluency (PRF) and Maze Fluency, teachers should use CBM passages written at the student's current grade level. However, if a student is well below grade-level expectations, he or she may need to read from a lower grade-level passage. (Lower grade-level passages are many times used during secondary and tertiary prevention.) To find the appropriate CBM reading level, follow these steps:

1. Determine the grade level text at which you expect the student to read competently by year's end.
2. Administer three passages at this level. Use generic CBM Passage Reading Fluency (PRF) passages, not passages that teachers use for instruction.
 - If the student reads fewer than 10 correct words in 1 minute, use the CBM Word Identification Fluency measure instead of CBM PRF or CBM Maze Fluency for progress monitoring.
 - If the student reads between 10 and 50 correct words in 1 minute but less than 85–90% correct, move to the next lower level of text and try three passages.
 - If the student reads more than 50 correct words in 1 minute, move to the highest level of text where he/she reads between 10 and 50 words correct in 1 minute (but not higher than the student's grade-appropriate text).
3. Maintain the student on this level of text for the purpose of progress monitoring for the *entire school year*.

The next few pages describe the reading CBM tasks mentioned in Figure 11. The National Center on Student Progress Monitoring Reading Manual has more in-depth information on these CBM reading measures. See Appendix A for information on obtaining CBM probes.

Letter Sound Fluency CBM

CBM Letter Sound Fluency (LSF) is used to monitor student progress in beginning decoding at kindergarten. CBM LSF is administered individually. The examiner presents the student with a single page showing 26 letters in random order. (See Figure 12 for an example.) The student has 1 minute to say the sounds that correspond with the 26 letters. The examiner marks student responses on a separate score sheet. The score is the number of correct letter sounds spoken in 1 minute. If the student finishes in less than 1 minute, the score is prorated. Five alternate forms, which can be rotated through multiple times, are available.

Figure 12: Student Copy of CBM Letter Sound Fluency Test

b	c	h	a
---	---	---	---

m	c	e	q	h	
d	j	y	a	n	
t	x	b	g	u	
s	z	p	f	l	
w	i	r	k	o	v

If the student answers correctly, the examiner immediately points to the next letter on the student copy. If the student answers incorrectly, the examiner marks the letter as incorrect by making a slash through that letter on the teacher's score sheet. If a student does not respond after 3 seconds, the examiner points to the next letter. As the student reads, the examiner does not correct mistakes.

At 1 minute, the examiner circles the last letters for which the student provides a correct sound. If the student finishes in less than 1 minute, the examiner notes the number of seconds it took to finish the letters. The score is adjusted if completed in less than 1 minute. Information on adjusting scores is available in the administration and scoring guide.

Look at the following CBM LSF score sheet. Abby mispronounced five letter sounds in 1 minute. The last letter sound she said correctly (/r/) is circled. Her score for the LSF would be 18. A score of 18 would be charted on Abby's CBM graph.

Figure 13: Abby's Sample CBM LSF Score Sheet

Score Sheet

Student's Name Abby H. Examiner's Initials JF
 Teacher's Name Mrs. Fischer Date of Testing Nov. 18
 School Darby Elementary

Letter Sound Fluency Test

If child does not say anything after 3 seconds: do not say anything, point to next letter. If names incorrect letter: keep going. Draw a diagonal slash through any letters the student does not say the sound for or says the sound incorrectly. Circle the last item that child attempts. Stop at 1 minute. If finished before 1 minute: record time.

m c e ~~h~~ d j ~~a~~ n t x ~~b~~ g u s z p ~~f~~ l w i (r) k o v

18 number of letters sounded correctly (in 60 seconds)
 _____ adjusted score (if completed test in less than 1 minute)

Word Identification Fluency

CBM Word Identification Fluency (WIF) is used to monitor students' overall progress in reading at first grade. CBM WIF is administered individually. The examiner presents the student with a single page with 50 words. (See Figure 14 for an example.) The student has 1 minute to read the words. The examiner marks student errors on a separate score sheet. The score is the number of correct words spoken in 1 minute. If the student finishes in less than 1 minute, the score is prorated.

Figure 14: Student Copy of CBM Word Identification Fluency Test

List 13

and	always	gave
as	going	car
at	until	probably
one	saw	fire
said	end	taken
into	room	problems
could	far	tree
than	form	common
new	become	hot
back	government	using
such	himself	doing
things	sun	main
same	known	thus
find	war	ask
went	learn	comes
between	I'm	street
want	eat	

The teacher scores a word as a "1" if it is correct and a "0" if it is incorrect. The examiner uses a blank sheet to cover the second and third columns. As the student completes a column, the blank sheet is moved to expose the next column. If the student hesitates, after 2 seconds, he or she is prompted to move to the next word. If the student is sounding out a word, he or she is prompted to move to the next word after 5 seconds. As the student reads, the examiner does not correct mistakes and marks errors on the score sheet.

At 1 minute, the examiner circles the last word the student reads. If the student finishes in less than 1 minute, the examiner notes the number of seconds it took to complete the word list, and the student score is adjusted.

Look at the following CBM WIF score sheet. Shameka mispronounced seven words in 1 minute. The last word she read correctly (car) is circled. Her score for the WIF is 29. A score of 29 is charted on Shameka's CBM graph.

Figure 15: Shameka's CBM Word Identification Fluency Score Sheet

List 13

Student's Name: Shameka S. Examiner's Initials: ST

Student's Teacher: Mr. Towler Date: Jan. 15

Score 1 for correct response, 0 for incorrect response.

and <u>1</u>	always <u>1</u>	gave <u>1</u>
as <u>1</u>	going <u>0</u>	car <u>1</u>
at <u>1</u>	until <u>1</u>	probably <u>1</u>
one <u>1</u>	saw <u>1</u>	fire <u>1</u>
said <u>0</u>	end <u>1</u>	taken <u>1</u>
into <u>1</u>	room <u>1</u>	problems <u>1</u>
could <u>1</u>	far <u>1</u>	tree <u>1</u>
than <u>1</u>	form <u>0</u>	common <u>1</u>
new <u>1</u>	become <u>0</u>	hot <u>1</u>
back <u>1</u>	government <u>0</u>	using <u>1</u>
such <u>1</u>	himself <u>1</u>	doing <u>1</u>
things <u>1</u>	sun <u>1</u>	main <u>1</u>
same <u>1</u>	known <u>0</u>	thus <u>1</u>
find <u>0</u>	war <u>1</u>	ask <u>1</u>
went <u>1</u>	learn <u>1</u>	comes <u>1</u>
between <u>1</u>	I'm <u>1</u>	street <u>1</u>
want <u>1</u>	eat <u>1</u>	

Total score = 29

Passage Reading Fluency

CBM Passage Reading Fluency (PRF) is used to monitor students' overall progress in reading at grades 1–8. Some teachers prefer Maze Fluency beginning at Grade 4. CBM PRF is administered individually. Each PRF test uses a different passage at the same grade level of equivalent difficulty.

For each CBM PRF reading probe, the student reads from a “student copy” that contains a grade-appropriate reading passage. (See Figure 16 for an example.) The examiner scores the student on an “examiner copy.” The examiner copy contains the same reading passage but has a cumulative count of the number of words for each line along the right side of the page. The numbers on the teacher copy allow for quick calculation of the total number of words a student reads in 1 minute.

Figure 16: Student Copy of CBM Passage Reading Fluency Test

Raymond lived in Georgia. He was born there and had many friends. One day Dad had come home from work to say that they would have to move far away. Dad worked in a factory. The factory had closed and Dad needed a new job. Dad had found a new job and now they had to move.

Raymond was sad because he did not want to leave his school. He did not want to leave his friends.

"I am sorry, son," said Dad.

"It is OK," said Raymond with a smile. He did not want Dad to feel bad.

They packed up the car and moved to a new state. Their new house was old and scary. "I wonder whether there are any ghosts living in our house," said Raymond. The house was big and dark. The front of the house was covered by trees. Even the trees looked scary. The blowing breeze made them look alive.

Inside, the house was dark, so Dad fixed the lights and turned them on. Then they unpacked the car and Raymond went up to his new room. The walls were cracked. Dad would paint them. Raymond was afraid to open the closet. He would do it later.

Raymond went down to the kitchen. Mom was making dinner. She had fried chicken and potatoes cooking because these were Raymond's favorites.

After dinner Raymond felt sleepy, so he went to his room to go to sleep. "Good night!" he called down to Mom and Dad.

"Sweet dreams," they said back.

Raymond got into bed and turned out the light. He began to fall asleep. Then he heard a loud noise. It came from the closet. Raymond

The examiner marks each student error with a slash (/). At the end of 1 minute, the last word read is marked with a bracket (]). If a student skips an entire line of a reading passage, a straight line is drawn through the skipped line. When scoring CBM probes, the teacher identifies the count for the last word read in 1 minute and the total number of errors. The teacher then subtracts errors from the total number of words to calculate the student score.

Look at this sample CBM PRF probe. Reggie made eight errors while reading the passage for 1 minute. The straight line drawn through the fourth line shows that he also skipped an entire line. The last word he read was "and" and a bracket was drawn after this word. In all, Reggie attempted 136 words. He skipped 15 words in the fourth line. Fourteen of those skipped words are subtracted from the total words attempted ($136 - 14 = 122$) and 1 of those skipped words is counted as an error. Reggie made eight additional errors for a total of nine errors. The nine errors are subtracted from the 122 words attempted: $122 - 9 = 113$. Reggie's reading score for this probe is 113.

Figure 17: Reggie's CBM Passage Reading Fluency Score Sheet

Raymond lived in Georgia. He was born there and had many	11
friends . One day Dad had come home from work to say that they	24
would have to move far away. Dad worked in a factory. The factory	37
had closed and Dad needed a new job. Dad had found a new job and	52
now they had to move.	57
Raymond was sad because he did not want to leave his school.	69
He did not want to leave his friends.	77
"I am sorry, son," said Dad.	83
"It is OK," said Raymond with a smile . He did not want Dad to	97
feel bad.	99
They packed up the car and moved to a new state. Their new	112
house was old and scary . "I wonder whether there are any ghosts	124
living in our house," said Raymond. The house was big and dark. The	137
front of the house was covered by trees. Even the trees looked scary.	150
The blowing breeze made them look alive.	157
Inside, the house was dark, so Dad fixed the lights and turned	169
them on. Then they unpacked the car and Raymond went up to his new	183
room. The walls were cracked. Dad would paint them. Raymond was	194
afraid to open the closet. He would do it later.	204
Raymond went down to the kitchen. Mom was making dinner.	214
She had fried chicken and potatoes cooking because these were	224
Raymond's favorites.	226
After dinner Raymond felt sleepy, so he went to his room to go	239
to sleep. "Good night!" he called down to Mom and Dad.	250
"Sweet dreams," they said back.	255
Raymond got into bed and turned out the light. He began to fall	268
asleep. Then he heard a loud noise. It came from the closet. Raymond	281

Maze Fluency

CBM Maze Fluency is available for students in grades 1–6, but typically teachers use CBM Maze Fluency beginning in Grade 4. CBM Maze Fluency can be administered to a group of students at one time. Students are presented with a Maze passage, and they have 2.5 minutes to read the passage to themselves and circle the word correct for each blank. The examiner monitors the students during the 2.5 minutes and scores each test later. The score is the number of correct replacements circled in 2.5 minutes.

When scoring CBM Maze Fluency, students receive one point for each correctly circled answer. Blanks with no circles are counted as errors. Scoring is discontinued if three consecutive errors are made. The number of correct answers within 2.5 minutes is the student score.

Look at the following CBM Maze score sheet. Juan circled 16 correct answers in 2.5 minutes. He circled seven incorrect answers. However, Juan did make three consecutive mistakes, and five of his correct answers were after his three consecutive mistakes. Juan's score for the Maze Fluency Test would be 10. A score of 10 would be charted on Juan's CBM graph.

Figure 18: Juan's CBM Maze Fluency Student Answer Sheet

THE CAVE TRIP

Mrs. Jones said that Cindy's class (was/ step/ hill) going on a field trip. The (stare/ class/ green) of third graders had never been (he/ on/ so) a field trip before. Cindy was (bed/ went/ very) excited. Mrs. Jones said that the (class/ chair/ peach) was going on a field trip (at/ to/ is) see the caves up in the mountains. (Show/ And/ The) class had been studying about caves (for/ sad/ kill) the last few weeks. Cindy (wet/ and/ ill) her classmates had seen pictures of (shout/ caves/ sing). Now, they were going to see (a/ are/ or) real cave.

A week later, the students (then/ her/ and) Mrs. Jones climbed onto a bus (four/ that/ dime) would take them to (and/ the/ sat) cave. It was early in the morning (at/ tap/ and) the air was chilly. Mrs. Jones (not/ sat/ had) warned all of the students to (bring/ pillow/ horse) a sweater because the air might (be/ to/ it) chilly in the cave. Cindy was (work/ jump/ very) glad that she had brought her sweater.

(Rain/ Halt/ The) bus driver started the engine and (the/ was/ got) bus began to roll. The bus (rolled/ mother/ girls) along the freeway. Finally the bus (lather/ coffee/ pulled) onto a little country road that (ate/ led/ pear) to the cave.

When the students arrived at the (goat/ math/ cave), all they could (see/ kite/ lot) was a mountain with a big (toys/ trees/ black) hole in the side. A

Basics of Math CBM

Across grades 1–6, two math CBM tasks can be used for progress monitoring. Kindergarten recommendations are not provided because RTI has not yet been researched in math at the kindergarten level. Recommendations for each grade level are in Figure 19.

Figure 19: Math CBM Recommendations by Grade

Grade	CBM Measure
Grade 1	Computation or Concepts and Applications
Grade 2	Computation or Concepts and Applications
Grade 3	Computation or Concepts and Applications
Grade 4	Computation or Concepts and Applications
Grade 5	Computation or Concepts and Applications
Grade 6	Computation or Concepts and Applications

For Computation and Concepts and Applications probes, teachers should use CBM probes for the student's current grade level. However, if a student is performing well below grade-level expectations, he or she may need to use lower-grade probes. (This may be especially true during secondary and tertiary prevention.) To find the appropriate CBM math level, follow these steps:

1. Determine the grade level probe at which you expect the student to perform in math competently by year's end.
2. On two separate days, administer a CBM test (either Computation or Concepts and Applications) at the grade level lower than the student's grade-appropriate level. Use the correct time limit for the test at the lower grade level, and score the tests according to the directions.
 - If the average score is less than 10, move down one level (or stay at first grade) and repeat this procedure.
 - If the average score is between 10 and 15, then use this level
 - If average is greater than 15, reconsider grade-appropriate material.
3. Maintain the student on this grade level for the purpose of progress monitoring for the *entire school year*.

The next few pages describe the math CBM tasks mentioned in Figure 19. The National Center on Student Progress Monitoring Math Manual has more in-depth information on these CBM math measures. See Appendix A for information on obtaining CBM probes.

Computation

CBM Computation includes tests at each grade level for grades 1–6. Each test consists of 25 math computation problems representing the year-long grade-level math computation curriculum. Within each grade level, the type of problems represented on each test remains constant from test to test. For example, at Grade 3, each Computation test includes five multiplication facts with factors 0–5 and four multiplication facts with factors 6–9. However, the facts to be tested and their positions on the test are selected randomly. Other types of problems remain similarly constant.

CBM Computation can be administered to a group of students at one time. Each student works on his or her own copy of the CBM Computation Test. Students have a set amount of time to answer the math problems on the Computation Test. Timing the CBM Computation Test correctly is critical to ensure consistency from test to test. See Figure 20 for the time limit at each grade. The examiner times the students during the test and scores the tests later. The score is the number of problems answered correctly.

Figure 20: Time Limits for CBM Computation

Grade	Time Limit
Grade 1	2 minutes
Grade 2	2 minutes
Grade 3	3 minutes
Grade 4	3 minutes
Grade 5	5 minutes
Grade 6	6 minutes

When scoring CBM Computation, students receive one point for each correctly answered digit. The number of digits correct within the set time limit is the student score.

Look at the following fifth-grade CBM Computation score sheet (Figure 21). Checkmarks were used to mark correct digits. Samantha answered 53 digits correctly in 5 minutes. Samantha's math score for this probe is 53.

Figure 21: Samantha's Computation Probe

Sheet #15

Computation 5

Password: HAT

Name: Samantha

Date: November 16

<p>A $\frac{3}{5} - \frac{2}{7} =$</p> <p>$\frac{21}{35} - \frac{10}{35} = \frac{11}{35}$ ✓✓</p>	<p>B</p> $\begin{array}{r} 5.697 \\ - 3.300 \\ \hline 2.397 \end{array}$ <p>✓✓✓✓</p>	<p>C</p> $\begin{array}{r} 27568 \\ + 46047 \\ \hline 73605 \end{array}$ <p>✓✓✓✓</p>	<p>D $\frac{3}{7} + \frac{4}{7} = \frac{7}{7} = 1$ ✓</p>	<p>E</p> $\begin{array}{r} 300 \\ \times 62 \\ \hline 600 \\ 18000 \\ \hline 18600 \end{array}$ <p>✓✓✓✓✓</p>
<p>F $8\frac{3}{11} - 2\frac{4}{11} =$</p>	<p>G</p> $\begin{array}{r} 2 \\ 528 \\ \times 33 \\ \hline 1584 \\ 15840 \\ \hline 17424 \end{array}$ <p>✓✓✓✓✓</p>	<p>H</p> $38 \overline{)76}$	<p>I</p> $\begin{array}{r} 3 \\ 599 \cancel{1} \\ - 24915 \\ \hline 35026 \end{array}$ <p>✓✓✓✓✓</p>	<p>J Rename as improper: ✓✓</p> $8\frac{1}{2} = \frac{17}{2}$ <p>✓</p>
<p>K Reduce: ✓</p> $\frac{4}{6} = \frac{2}{3}$ <p>✓</p>	<p>L Rename as mixed: ✓</p> $\frac{16}{3} = 5\frac{1}{3}$ <p>✓✓</p>	<p>M</p> $\begin{array}{r} 8.492 \\ + .160 \\ \hline 8.652 \end{array}$ <p>✓✓✓✓</p>	<p>N $5\frac{3}{5} + 2\frac{3}{5} =$</p> <p>$7\frac{6}{5} = 8\frac{1}{5}$ ✓</p>	<p>O</p> $\begin{array}{r} 66000 \\ 7594 \\ 248 \\ + 930 \\ \hline 74772 \end{array}$ <p>✓✓✓✓✓</p>
<p>P</p> $\begin{array}{r} 10 \\ 8 \overline{)726} \\ \underline{72} \\ 06 \\ \underline{0} \\ 6 \end{array}$ <p>✓✓ R6 ✓</p>	<p>Q Reduce: ✓</p> $\frac{3}{12} = \frac{1}{4}$ <p>✓</p>	<p>R $\frac{8}{9} - \frac{1}{3} =$</p>	<p>S</p> $7 \overline{)847}$	<p>T</p> $\begin{array}{r} 68650 \\ - 7397 \\ \hline \end{array}$
<p>U *Rename as improper:</p> $6\frac{2}{3} =$	<p>V</p> $28 \overline{)68}$	<p>W $\frac{2}{3} + \frac{2}{9} =$</p>	<p>X Rename as mixed:</p> $\frac{37}{8} =$	<p>Y $\frac{2}{5} + \frac{2}{7} =$</p>

Concepts and Applications

The math CBM Concepts and Applications probes include tests at each grade level for grades 1–6. Each test consists of 18–25 math computation problems representing the year-long, grade-level math Concepts and Applications curriculum. Each test is three pages long. Within each grade level, the type of problems represented on each test remains constant from test to test. For example, at Grade 3, every Concepts and Applications Test includes two problems dealing with charts and graphs and three problems dealing with number concepts. Other types of problems remain similarly constant. The placement of the various types of items is random from test to test, and the actual problems differ from test to test.

CBM Concepts and Applications can be administered to a group of students at one time. The examiner presents each student with a CBM Concepts and Applications Test. Students have a set amount of time to answer the math problems on the test. Timing the CBM Concepts and Applications Test correctly is critical to ensure consistency from test to test. See Figure 22 for the time limit at each grade. The examiner times the students during the test and scores the tests later. The score is the number of problems answered correctly.

Figure 22: Time Limits for Concepts and Applications Probes

Grade	Time Limit	Number of Problems
Grade 1	Read aloud	22 problems
Grade 2	8 minutes	18 problems
Grade 3	6 minutes	24 problems
Grade 4	6 minutes	24 problems
Grade 5	7 minutes	23 problems
Grade 6	7 minutes	24–25 problems

When scoring CBM Concepts and Applications, students receive one point for each correctly answered problem. The number of correctly answered problems within the set time limit is the student score.

Look at the following third-grade CBM Concepts and Applications score sheet. Ben answered 21 blanks correctly in 8 minutes. Ben’s math score for this probe is 21.

Figure 23: Ben's Concepts and Applications Probe

Name Ben Date March 20 Test 13 Page 1

Column A Applications 2 Column B

(1) Write the answer in the blank.


Larry spends 31¢ at the toy store.
Paul spends 43¢ more than Larry.
How much money does Paul spend?

$\begin{array}{r} 31 \\ + 43 \\ \hline 74 \end{array}$ 74¢ ✓

(2) Write the number in the blank.

$\checkmark \quad 7 + 2 = 2 + 7$

(3) Write the time.




1:15 ✓ ✓

(4) Counting by 3's, fill in the blanks.


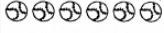
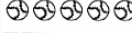
45, 48, 51, 52, 53


(5) How much money?



\$1.02

(6) Hours of Ball Practice

Jordan	
Kimuli	
Ebony	

Each  means 1 hour of practice

Write the number in each blank.

How many more hours does Kimuli practice ball than Ebony? 1 ✓

How many hours does Jordan practice ball? 3 ✓

How many fewer hours does Jordan practice ball than Ebony? 3


(7) Fill in the blanks.


105 = 1 hundreds 0 tens 5 ones


Name Ben Date _____ Test 13 Page 2

Column C Applications 2 Column D

(8) Write the letter of the matching fraction in each blank.

$\checkmark \quad B$  (A) $\frac{1}{3}$

$\checkmark \quad D$  (B) $\frac{1}{2}$

A  (C) $\frac{1}{4}$

(9) Write + or - in the blank.

$9 \quad + \quad 6 = 15$

(10) Write the number in the blank.

Of these numbers,
79 73 64

$\checkmark \quad 64$ is the smallest.
 $\checkmark \quad 79$ is the largest.

(11) Counting by 2's, fill in the blanks.

8, 10, 12, 14, 15 ✓

(12) Write the number in the blank.

$10 + 1 = 1 + \underline{12}$

(13) Write the answer in the blank.

There are 13 white mice in the pet store and 14 gray mice. How many mice are there in all?

$\begin{array}{r} 13 \\ + 14 \\ \hline 27 \end{array}$ 26

(14) Look at this group of numbers.

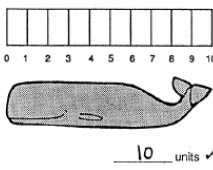
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20

Write the third number. 3 ✓
Write the fifteenth number. 15 ✓
Write the twentieth number. 20 ✓

Name _____ Date _____ Test 13 Page 3





Column E Applications 2 Column F

(15) How long is the whale?



10 units ✓

(16) Favorite Vegetables

Peas	
Greens	
Corn	
Carrots	

Number of Votes

Write the number in each blank.

How many more votes did corn get than carrots? 2

How many votes did greens get? 3 ✓

How many votes did greens and peas get together? 11 ✓


(17) Write + or - in the blank.

$10 \quad - \quad 7 = 3$

(18) Write the letter in the blank.

The holiday play falls on which day of the week?

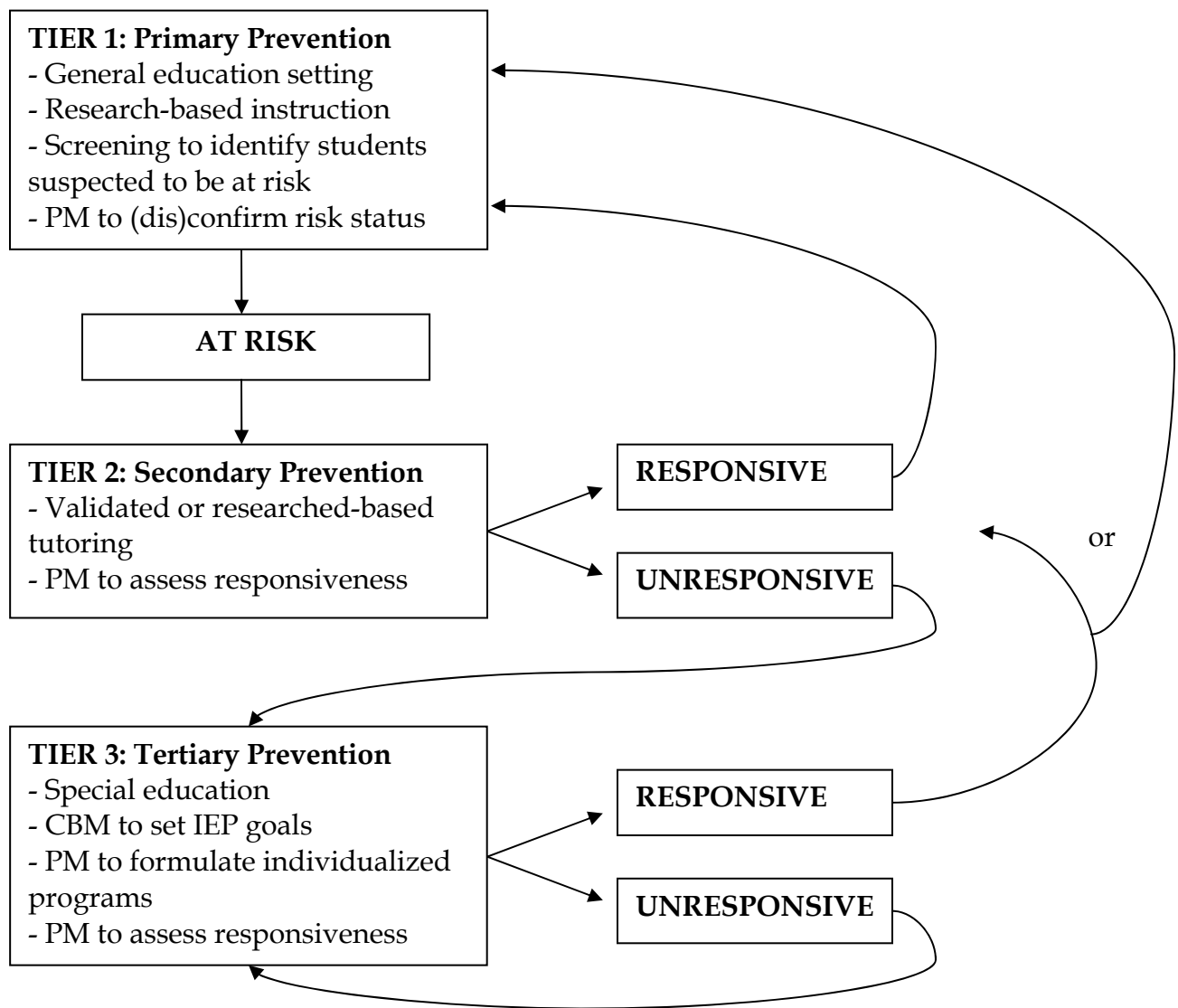
(A) Monday
(B) Wednesday
(C) Tuesday



Three Tiers of RTI

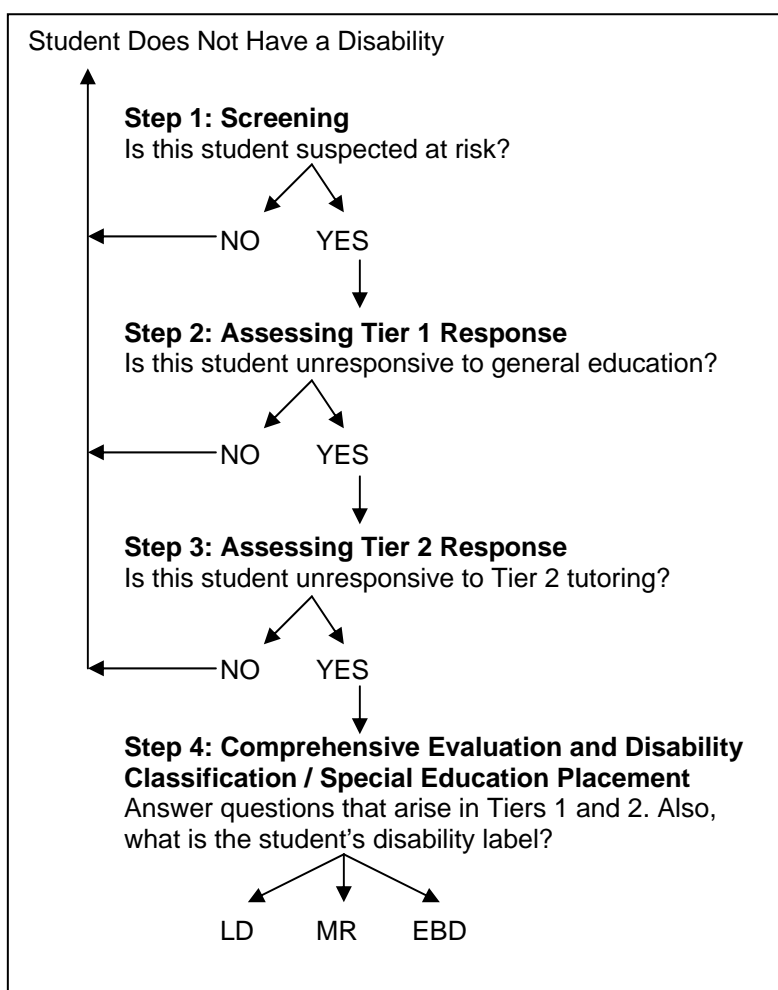
This flow chart represents the three tiers of RTI. Tier 1, primary prevention, represents the general education settings. Students receive research-based instruction, and progress monitoring (PM) is used to identify students who are at risk for difficulties. Students unresponsive to primary prevention move into Tier 2, or secondary prevention, where they receive research-based tutoring in a small-group setting. PM is used to identify student responsiveness.

Students who are responsive to secondary prevention move back into Tier 1 (primary prevention). Students who are unresponsive move into Tier 3 (tertiary prevention). Tier 3 takes place in the special education setting. Tier 2 (secondary prevention) serves as a middle level of preventative intensity between general and special education.



Another helpful way to understand how students move through the multitier prevention system is by this flow chart. (See Figure 24.) If the answer is “yes” for Step 1, the student moves to Step 2. Step 2 assesses student response in the general education intervention in Tier 1. If the answer is “yes,” the student moves to Step 3. Step 3 assesses student response to the intervention tutoring in Tier 2. If the answer is “yes,” the student is referred to special education. Any time the answer is “no,” the student is determined not to have a disability.

Figure 24: Student Flow Chart for RTI



Tier I—Primary Prevention: Screening

During primary prevention, or Tier 1, all students are screened (i.e., tested once) in the fall using CBM. Students scoring below a cut-score are suspected to be “at risk.” For these students suspected to be at risk, response to general education is monitored using CBM.

Figure 25 shows the cut-off points for screening, where students are considered as possibly at risk for reading failure. If students fall below the appropriate cut-off, they are suspected to be at risk and are then progress monitored for 6–10 weeks to confirm or disconfirm whether they are truly at risk for reading failure. The data provided below may change pending additional RTI research.

Figure 25: Reading Risk With Fall CBM Screening

Grade	CBM Probe	Cut-off
Kindergarten	Letter Sound Fluency	< 10 letters/minute
Grade 1	Word Identification Fluency	< 15 words on list/minute
Grade 2	Passage Reading Fluency	< 15 words in text/minute
Grade 3	Passage Reading Fluency	< 50 words in text/minute
Grade 4	Maze Fluency	< 10 Maze replacements / 2.5 minutes
Grade 5	Maze Fluency	< 15 Maze replacements/2.5 minutes
Grade 6	Maze Fluency	< 20 Maze replacements/2.5 minutes

Figure 26 shows the cut-off points for screening, where students are considered as possibly at risk for math failure. If students fall below the appropriate cut-off, they are suspected to be at risk and are then progress monitored for 6–10 weeks to confirm or disconfirm whether they are truly at risk for math failure. The data provided below may change pending additional RTI research.

Figure 26: Math Risk With Fall CBM Screening

Grade	Computation Cut-off	Concepts & Applications Cut-off
Grade 1	< 5 digits	< 5 points
Grade 2	< 10 digits	< 10 points
Grade 3	< 10 digits	< 10 points
Grade 4	< 10 digits	< 5 points
Grade 5	< 15 digits	< 5 points
Grade 6	< 15 digits	< 5 points

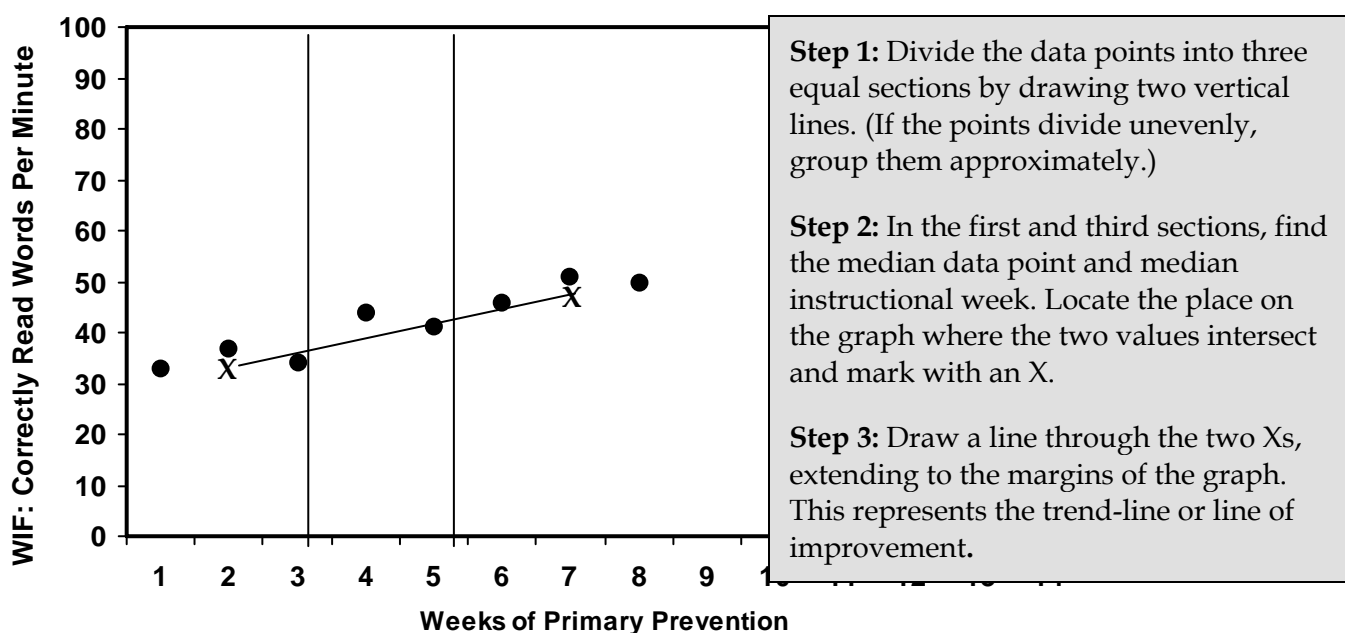
Once students are suspected to be at risk in either reading or math, they continue to participate in the general education intervention for another 6–10 weeks. During this time, appropriate CBM is administered weekly to all at-risk students.

At the end of the 6–10 weeks, the student's risk status is confirmed or disconfirmed by quantifying the response to primary prevention. To do this, the student's rate of improvement or slope across 6–10 CBM data points is calculated. Students with a low slope, indicating inadequate progress, are confirmed as at risk and then move to secondary prevention tutoring.

To determine the student's slope, graph the 6–10 CBM scores. (See Figure 27 as an example.) To draw a trend-line and determine slope, use a procedure called the Tukey method. Follow these steps for the Tukey method.

1. Divide the data points into three equal sections by drawing two vertical lines. (If the points divide unevenly, group them approximately.)
2. If the first and third sections, find the median data point and CBM week. Locate the place on the graph where the two values intersect and mark with an X.
3. Draw a line through the two Xs.

Figure 27: Drawing a Trend-Line Using the Tukey Method



The formula for calculating the slope of the line is:
$$\frac{\text{3rd median} - \text{1st median}}{\# \text{ of data points} - 1}$$

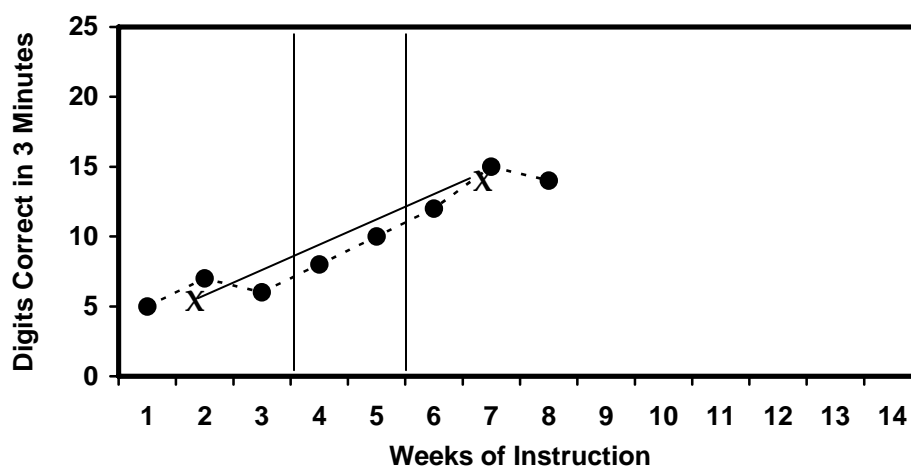
In this example the slope of the line is $(48 - 32) \div 7 = 2.28$.

Figure 28 shows the reading and math slopes deemed inadequate as measured by CBM after 6–10 weeks of general education instruction. The data provided below may change pending additional RTI research.

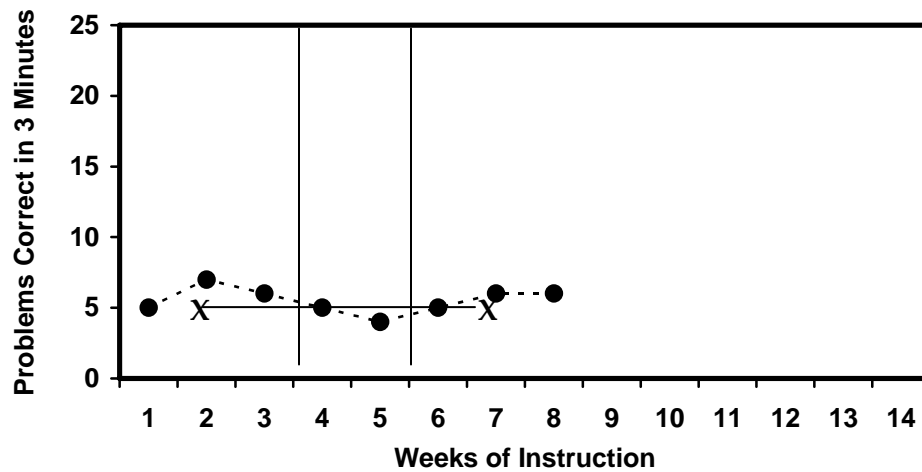
Figure 28: Inadequate Reading and Math Slopes—Primary Prevention

Grade	Inadequate Reading Slope	Inadequate Math Computation Slope	Inadequate Math Concepts and Applications Slope
Kindergarten	< 1 (LSF)	< 0.20	< 0.20
Grade 1	< 1.8 (WIF)	< 0.25	< 0.30
Grade 2	< 1 (PRF)	< 0.20	< 0.30
Grade 3	< 0.75 (PRF)	< 0.20	< 0.50
Grade 4	< 0.25 (Maze)	< 0.50	< 0.50
Grade 5	< 0.25 (Maze)	< 0.50	< 0.50
Grade 6	< 0.25 (Maze)	< 0.50	< 0.50

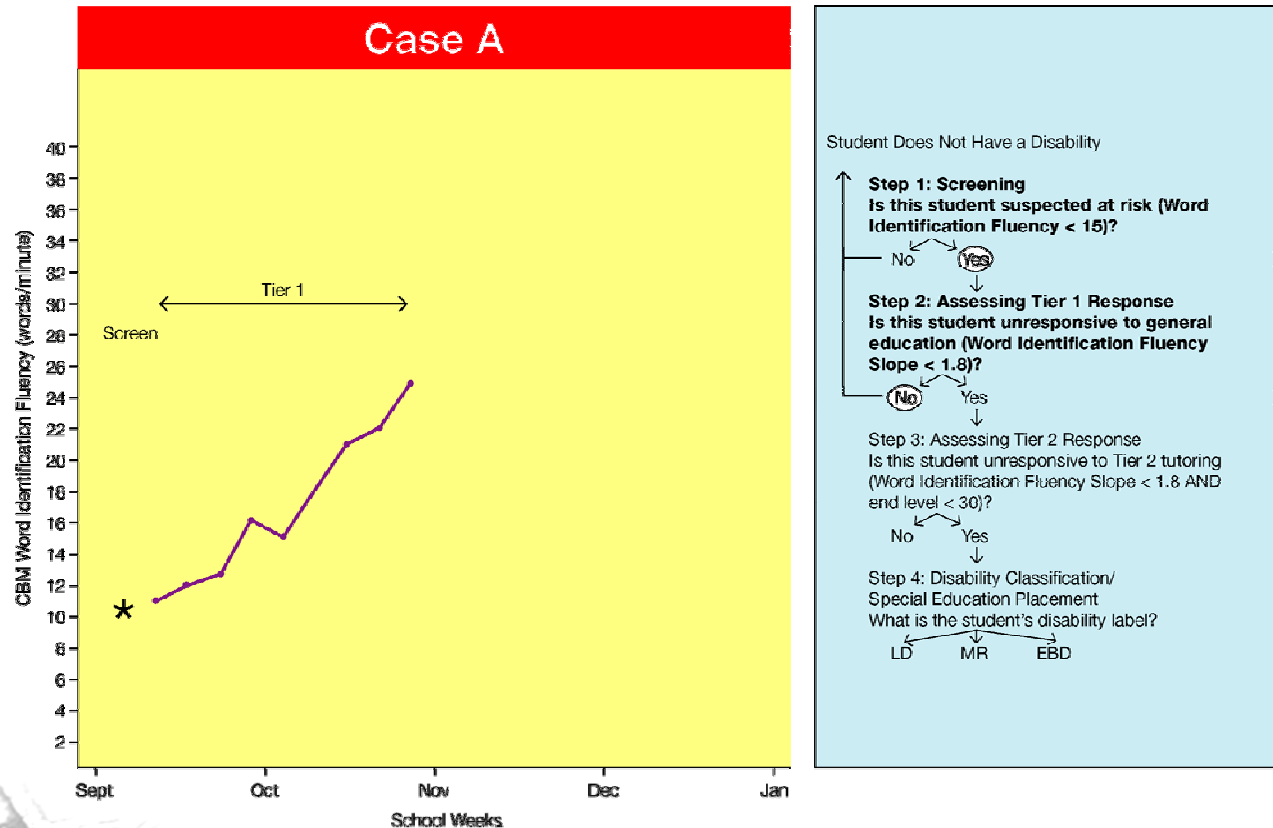
The graph in Figure 29 has a CBM Computation slope of $(14 - 5) \div 7 = 1.29$, so this fourth-grade student is exceeding the 0.50 cut-off. This student is progressing adequately in primary prevention in the general education classroom.

Figure 29: Sample Computation Graph—Adequate Slope

Look at Figure 30. The slope for this student's computation CBM is $(5 - 5) \div 7 = 0$. This student's slope is less than the 0.50 cut-off for grade 4. This student's risk status would be confirmed, and he or she would enter Tier 2, or secondary prevention.

Figure 30: Sample Computation Graph—Inadequate Slope

Below, Figure 31 shows a student's progress on CBM Word Identification Fluency in first grade. Look at the steps on the right-hand side. Step 1 asks whether the student is suspected to be at risk. The answer is "yes" so he or she moves onto Step 2. Step 2 asks about the responsiveness to the general education program. The answer is "no" so the conclusion is that the student does not have a disability.

Figure 31: Tier 1 Student Progress Flow Chart

Let's review primary prevention, or Tier 1.

- All classroom students screened in fall to identify suspected at-risk students. These suspected at-risk students are identified by low performance on reading or math CBM. (See Figures 25 and 26.)
- Suspected at-risk students remain in the general education intervention and are monitored weekly using CBM for 6–10 weeks to confirm or disconfirm at-risk status. CBM scores are graphed and slopes are calculated.
 - Students with adequate slopes remain in primary prevention (general education) and do not have a disability.
 - Students with inadequate slopes move to Tier 2, or secondary prevention, to determine whether they have a disability.

Tier 2—Secondary Prevention: Tutoring

During Tier 2, or secondary prevention, students who demonstrate inadequate CBM slope growth during Tier 1, or primary prevention, are tutored in small groups of two to four students. The tutoring is conducted three to four times a week with each session lasting anywhere from 30 to 60 minutes. The tutoring is conducted by trained and supervised personnel (not the classroom teacher). Tutoring lasts 10 to 20 weeks.

The tutoring program should include a point system for motivation and provide students with immediate corrective feedback. Students should master content before moving on to more difficult tutoring activities. Students work with their tutor to set goals and learn how to self-monitor their learning.

Training the tutors to implement the tutoring intervention effectively is a very important aspect of secondary prevention. When learning to implement the tutoring, tutors should be presented with demonstrations of each tutoring activity and have time to practice the tutoring strategies. Tutors should schedule practice time with one another before tutoring students in the schools. Tutors could also practice with age-appropriate students who are not the actual students to be tutored. Weekly meetings for the tutors should be arranged so tutors can share ideas, plan for upcoming tutoring sessions, and problem solve.

During secondary prevention, student progress is monitored on a weekly basis. Student reading or math scores are graphed and slopes are calculated. After tutoring has ended, student response to tutoring is assessed.

Figure 32 shows the cut-off response rates to Tier 2 (secondary prevention) tutoring in reading. Unresponsiveness can be determined by an inadequate slope or end CBM level. If students fall below the appropriate cut-off, they may enter another Tier 2 tutoring program or be transitioned to Tier 3 special education. The data provided below may change pending additional RTI research.

Figure 32: Quantifying Response to Tier 2 Reading

Grade	CBM Probe	< Slope	< End Level
Kindergarten	Letter Sound Fluency	< 1	< 30
Grade 1	Word Identification Fluency	< 1.8	< 30
Grade 2	Passage Reading Fluency	< 1	< 60
Grade 3	Passage Reading Fluency	< 0.75	< 70
Grade 4	Maze Fluency	< 0.25	< 25
Grade 5	Maze Fluency	< 0.25	< 25
Grade 6	Maze Fluency	< 0.25	< 25

Figure 33 shows the cut-off response rates to secondary prevention tutoring in math. Unresponsiveness can be determined by an inadequate slope or end CBM level, or a combination of both. The data provided below may change pending additional RTI research.

(Remember, many times students in secondary prevention use CBM Computation or Concepts and Applications tests that are below their actual grade level. See the computation discussion in this manual for information.)

Figure 33: Quantifying Response to Tier 2 Math

Grade	Computation		Concepts and Applications	
	< Slope	< End Level	< Slope	< End Level
Grade 1	< 0.50	< 20 digits	< 0.40	< 20 points
Grade 2	< 0.40	< 20 digits	< 0.40	< 20 points
Grade 3	< 0.40	< 20 digits	< 0.70	< 20 points
Grade 4	< 0.70	< 20 digits	< 0.70	< 20 points
Grade 5	< 0.70	< 20 digits	< 0.70	< 20 points
Grade 6	< 0.70	< 20 digits	< 0.70	< 20 points

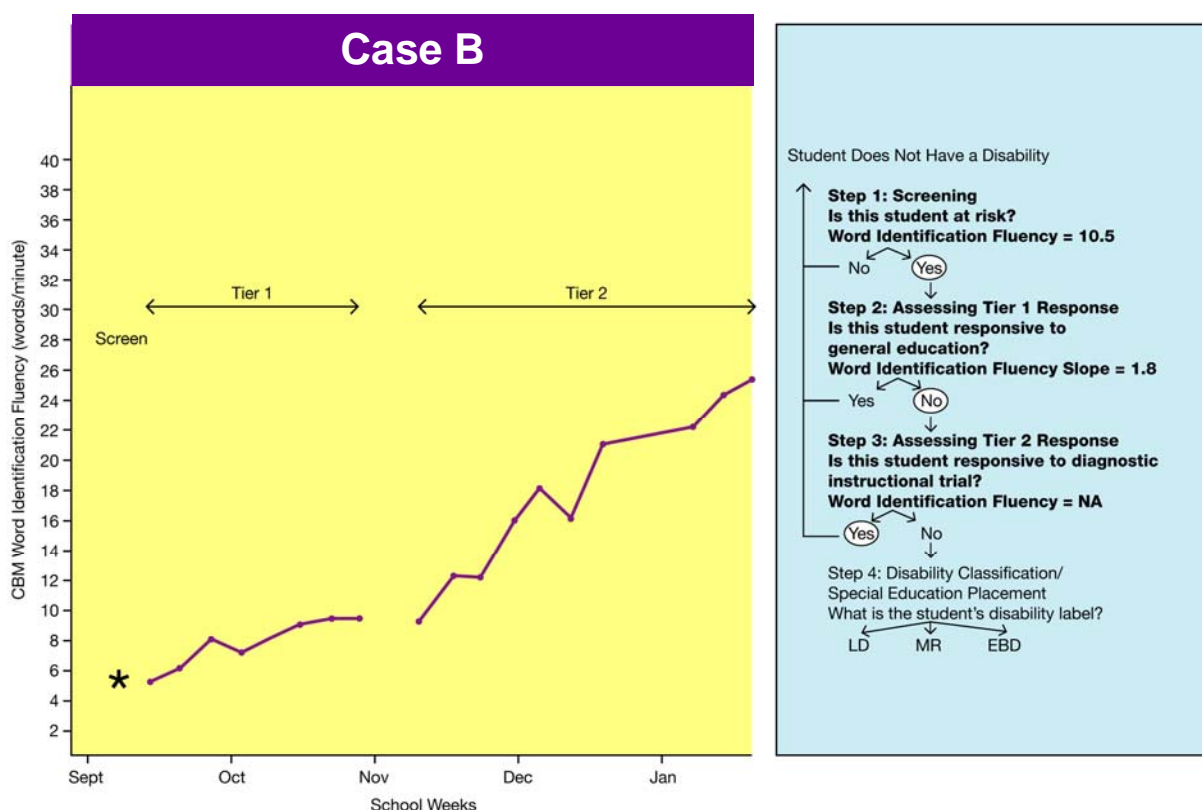
If student performance is inadequate according to either the slope or end-level figures provided in Figures 32 and 33, two courses of action can be taken.

First, in some versions of RTI, the student participates in another round of small-group tutoring either similar to or different from the tutoring that already was delivered. Student progress is monitored weekly, and the student's slope and end level are evaluated at the end of the second secondary prevention round of tutoring.

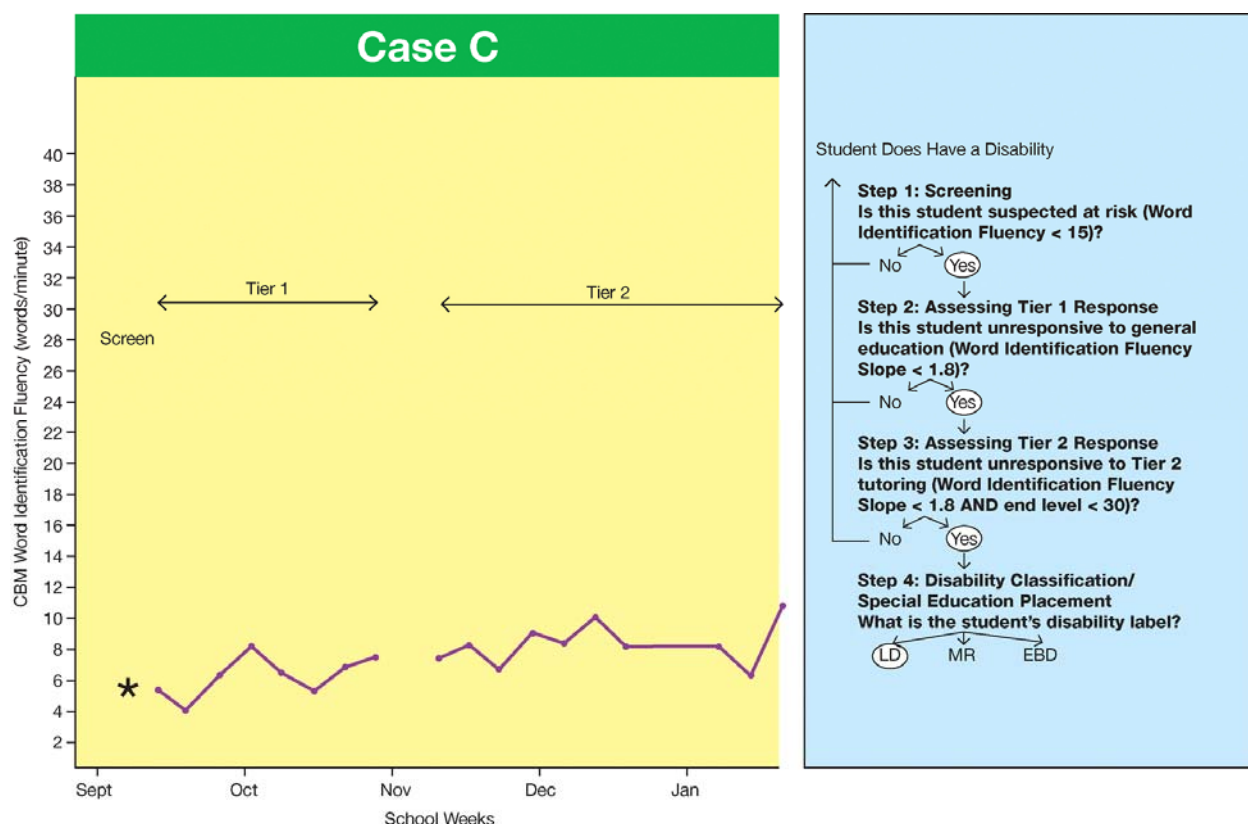
Second, the student would move into Tier 3. A multidisciplinary committee would answer questions generated during primary and secondary prevention, determine whether the student had a disability, and suggest appropriate special education services.

Below, Figure 34 shows a student's progress on CBM Word Identification Fluency in first grade. Look at the steps on the right-hand side. Step 1 asks whether the student is suspected to be at risk. The answer is "yes" so he or she moves onto Step 2. Step 2 asks about the responsiveness to the general education program. The answer is "yes" so the student moves into secondary prevention. Step 3 asks whether the student is responsive to small-group intervention. The answer is "yes" so the student does not have a disability and is returned to the general education, primary prevention program.

Figure 34: Tier 2 Student Progress Flow Chart—Responsive-to-Intervention



Below, Figure 35 shows a student's progress on CBM Word Identification Fluency in first grade. Step 1 asks whether the student is suspected to be at risk. The answer is "yes" so he or she moves onto Step 2. Step 2 asks about the responsiveness to the general education program. The answer is "yes" so the student moves onto secondary prevention, or Tier 2. Step 3 asks whether the student is responsive to small-group intervention. This time, the answer is "no" so the student moves onto tertiary prevention, or Tier 3. At that time, the student receives a comprehensive evaluation and possible disability classification.

Figure 35: Tier 2 Student Progress Flow Chart—Unresponsive to Intervention

Let's review secondary prevention, or Tier 2.

- Students suspected of being at risk with inadequate CBM performance in primary prevention are tutored in small groups using research-based interventions taught by school personnel.
- Student progress is monitored on a weekly basis throughout the tutoring.
 - Students with adequate slopes or end levels return to the general education, primary prevention program and do not have a disability.
 - Students with inadequate slopes move to tertiary prevention, or Tier 3, where a comprehensive evaluation answers questions about primary and secondary prevention response, classifies disability, and determines appropriate special education services.

Tier 3—Tertiary Prevention: Special Education

Once students enter Tier 3, IEP goals are set and monitored for each student. Effective individualized programs are designed for individual students. During Tier 3, student progress is monitored on a weekly basis, and students can return to the general education classroom if they have certain slopes or end levels.

Setting IEP Goals

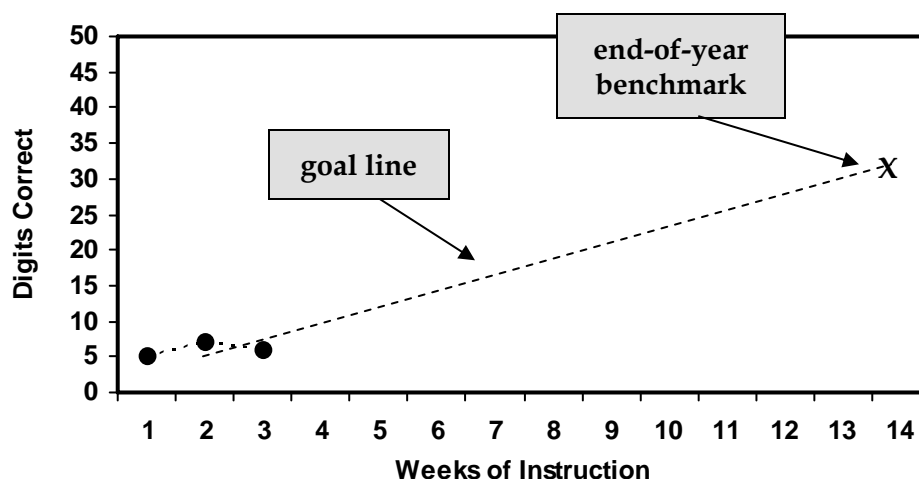
There are three options for setting IEP goals. The first option is end-of-year benchmarking. For typically developing students at the grade level where the student is being monitored, identify the end-of-year CBM benchmark. (See Figure 36.) This is the end-of-year performance goal. The benchmark is represented on the graph by an X at the date marking the end of the year. A goal-line is then drawn between the median of at least the first three CBM graphed scores and the end-of-year performance goal.

Figure 36: Typical End-of-Year Benchmarks in Reading and Math

Grade	Reading	Computation	Concepts and Applications
Kindergarten	40 sounds/minute (LSF)	—	—
Grade 1	60 words/minute (WIF)	20 digits	20 points
Grade 2	75 words/minute (PRF)	20 digits	20 points
Grade 3	100 words/minute (PRF)	30 digits	30 points
Grade 4	20 replacements/2.5 minutes (Maze)	40 digits	30 points
Grade 5	25 replacements/2.5 minutes (Maze)	30 digits	15 points
Grade 6	30 replacements/2.5 minutes (Maze)	35 digits	15 points

Figure 37 shows a sample graph for a third-grade student working on CBM Computation. The end-of-year benchmark of 30 digits is marked with an X and a goal-line is drawn between the first few data points and the X.

Figure 37: Sample Graph With End-of-Year Benchmark



The second option for setting IEP goals is by an intra-individual framework. To use this option, identify the weekly rate of improvement (slope) for the target student under baseline conditions, using at least eight CBM data points. Multiply this slope by 1.5. Take this product

and multiply it by the number of weeks until the end of the year. Add this product to the student's baseline score. This sum is the end-of-year goal.

For example, a student's first eight CBM scores were 3, 2, 5, 6, 5, 5, 7, and 4. To calculate the weekly rate of improvement (slope), find the difference between third median point and first median point. In this instance, that's approximately $6 - 3 = 3$. Since eight scores have been collected, divide the difference by the number of data points minus 1. So, $(6 - 3) \div 7 = 0.43$.

0.43 is multiplied by 1.5: $0.43 \times 1.5 = 0.645$. Multiply the product of 0.645 by the number of weeks until the end of the year. If there are 14 weeks left until the end of the year: $0.645 \times 14 = 9.03$. The average score of the first eight data points was 4.625. The sum of 9.03 and the average score is the end-of-year performance goal: $9.03 + 4.625 = 13.66$. The student's end-of-year performance goal would be 13.66. 13.66 would be plotted on the student's graph and a goal-line would be drawn.

The third option for setting IEP goals is by using national norms of improvement. For typically developing students at the grade level where the student is being monitored, identify the average rate of weekly increase from a national norm chart. (See Figure 38.)

Figure 38: CBM Reading and Math Norms for Student Growth (Slope)

Grade	Reading—Slope	Computation CBM— Slope for Digits Correct	Concepts and Applications CBM—Slope for Points
Kindergarten	No data available	—	—
Grade 1	1.8 (WIF)	0.35	No data available
Grade 2	1.5 (PRF)	0.30	0.40
Grade 3	1.0 (PRF)	0.30	0.60
Grade 4	0.40 (Maze)	0.70	0.70
Grade 5	0.40 (Maze)	0.70	0.70
Grade 6	0.40 (Maze)	0.40	0.70

For example, a fourth-grade student's average score from his first three CBM Computation probes is 14. The norm for fourth-grade students is 0.70. To set an ambitious goal for the student, multiply the weekly rate of growth by the number of weeks left until the end of the year. If there are 16 weeks left, multiply 16 by 0.70: $16 \times 0.70 = 11.2$. Add 11.2 to the baseline average of 14 ($11.2 + 14 = 25.2$). This sum (25.2) is the end-of-year performance goal. 25.2 would be plotted on the student's graph and a goal-line would be drawn.

Monitoring and Developing Individualized Instructional Programs

Once IEP goals are set and individualized programs are implemented, it is important to monitor student progress. CBM can judge the adequacy of student progress and the need to change instructional programs. Standard decision rules guide decisions about the adequacy of student progress and the need to revise goals and instructional programs.

Decision rules based on the most recent four consecutive scores:

- If the most recent four consecutive CBM scores are above the goal-line, the student's end-of-year performance goal needs to be increased.
- If the most recent four consecutive CBM scores are below the goal-line, the teacher needs to revise the instructional program.

Decision rules based on the trend-line:

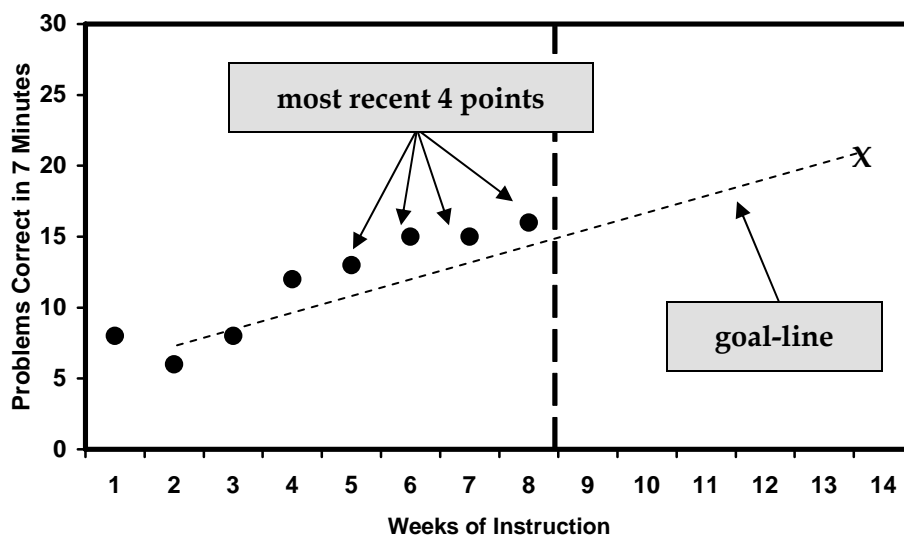
- If the student's trend-line is steeper than the goal-line, the student's end-of-year performance goal needs to be increased.
- If the student's trend-line is flatter than the goal-line, the teacher needs to revise the instructional program.
- If the student's trend-line and goal-line are the same, no changes need to be made.

The following figures (39–43) show examples of how each decision rule can be used to make decisions about student goals and instructional programs.

On Figure 39, the most recent four scores are above the goal-line. Therefore, the student's end-of-year performance goal needs to be adjusted. The teacher increases the desired rate (or goal) to boost the actual rate of student progress.

The point of the goal increase is notated on the graph as a dotted vertical line. This allows teachers to visually note when the student's goal was changed. The teacher reevaluates the student's graph in another seven to eight data points.

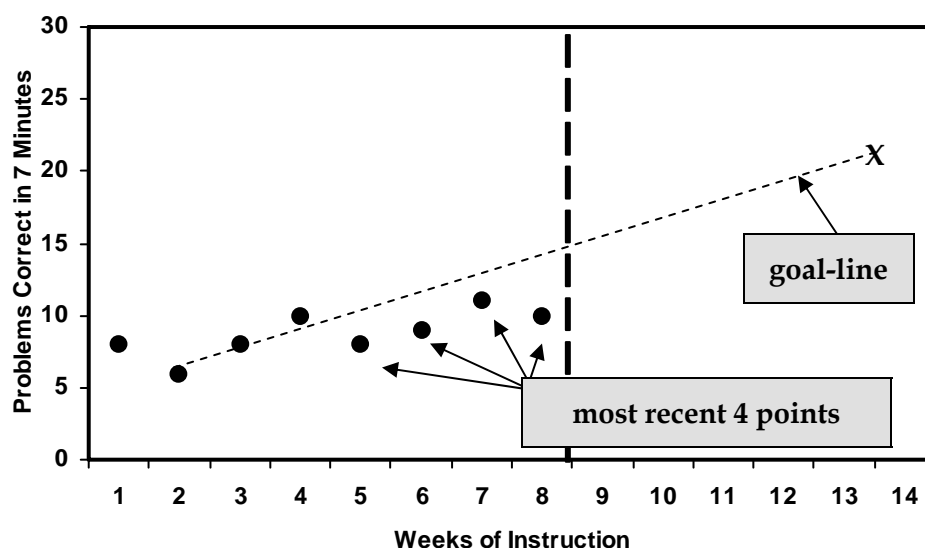
Figure 39: Four Consecutive Scores Above Goal-Line



On Figure 40, the most recent four scores are below the goal-line. Therefore, the teacher needs to change the student's instructional program. The end-of-year performance goal and goal-line never decrease; they can only increase. The instructional program should be tailored to bring a student's scores up so they match or surpass the goal-line.

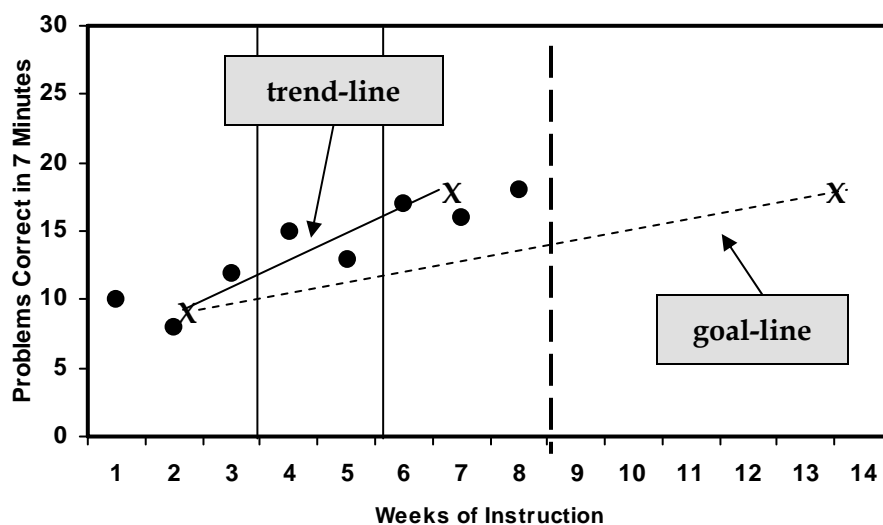
The teacher draws a dotted vertical line when making an instructional change. This allows teachers to visually note when changes to the student's instructional program were made. The teacher reevaluates the student's graph in another seven to eight data points to determine whether the change was effective.

Figure 40: Four Consecutive Scores Below Goal-Line



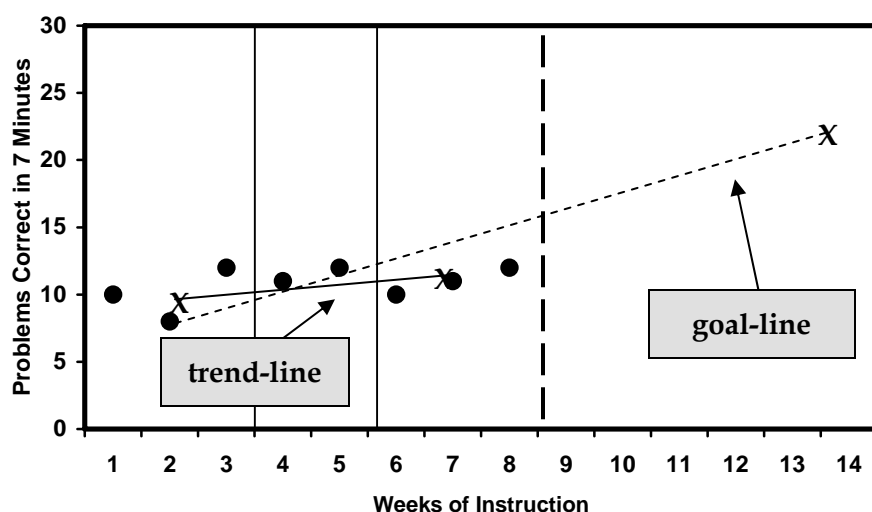
In Figure 41, the trend-line is steeper than the goal-line. Therefore, the student's end-of-year performance goal needs to be adjusted. The teacher increases the desired rate (or goal) to boost the actual rate of student progress. The new goal-line can be an extension of the trend-line.

The point of the goal increase is notated on the graph as a dotted vertical line. This allows teachers to visually note when the student's goal was changed. The teacher reevaluates the student's graph in another seven to eight data points.

Figure 41: Trend-Line Above Goal-Line

In Figure 42, the trend-line is flatter than the performance goal-line. The teacher needs to change the student's instructional program. Again, the end-of-year performance goal and goal-line are never decreased! A trend-line below the goal-line indicates that student progress is inadequate to reach the end-of-year performance goal. The instructional program should be tailored to bring a student's scores up.

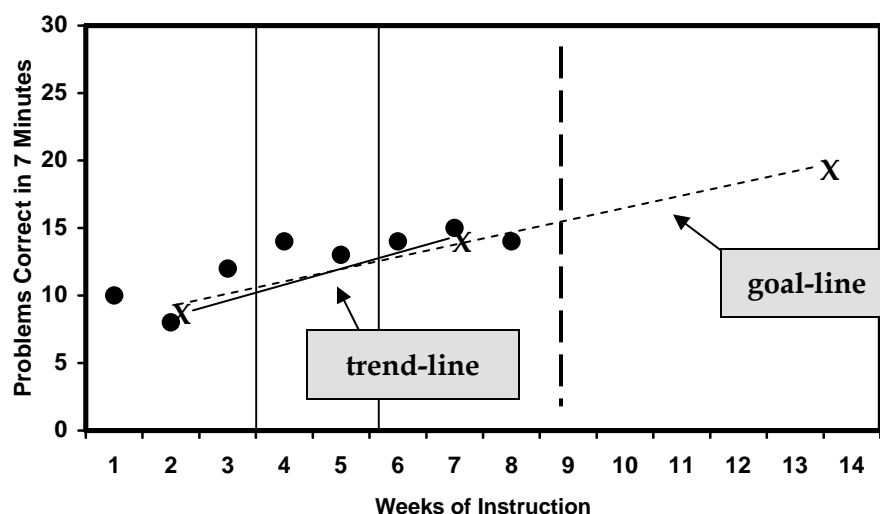
The point of the instructional change is represented on the graph as a dotted vertical line. This allows teachers to visually note when the student's instructional program was changed. The teacher reevaluates the student's graph in another seven to eight data points.

Figure 42: Trend-Line Below Goal-Line

In Figure 43, the trend-line matches the goal-line, so no change is currently needed for the student.

The teacher reevaluates the student's graph in another seven to eight data points to determine whether an end-of-year performance goal or instructional change needs to take place.

Figure 43: Trend-Line Matches Goal-Line



Quantifying Student Response

Figure 44 shows the cut-off points for Tier 3 instruction in reading. If students score above these cut-off points, they could return to the general education intervention while continuing to have their progress monitored. The data provided below may change pending additional RTI research.

Figure 44: Quantifying Response to Tier 3 Reading

Grade	CBM Probe	> Slope	>End level
Kindergarten	Letter Sound Fluency	> 1	> 40
Grade 1	Word Identification Fluency	> 1.8	> 50
Grade 2	Passage Reading Fluency	> 1	> 60
Grade 3	Passage Reading Fluency	>0.75	> 70
Grade 4	Maze Fluency	>0.25	> 25
Grade 5	Maze Fluency	>0.25	> 25
Grade 6	Maze Fluency	>0.25	> 25

Figure 45 shows the cut-off points for Tier 3 instruction in math. (Students may actually use CBM tests below their actual grade level.) The data provided below may change pending additional RTI research.

Figure 45: Quantifying Response to Tier 3 Math

Grade	Computation		Concepts and Applications	
	> Slope	> End Level	> Slope	> End Level
Grade 1	> 0.50	> 20 digits	> 0.40	> 20 points
Grade 2	> 0.40	> 20 digits	> 0.40	> 20 points
Grade 3	> 0.40	> 20 digits	> 0.70	> 20 points
Grade 4	> 0.70	> 20 digits	> 0.70	> 20 points
Grade 5	> 0.70	> 20 digits	> 0.70	> 20 points
Grade 6	> 0.70	> 20 digits	> 0.70	> 20 points

Let's review Tier 3.

- Students receive special education services. IEP goals are established and effective individualized programs are designed and implemented.
- Student progress is monitored on a weekly basis.
 - Students with adequate slopes or end levels return to primary prevention (general education) or secondary prevention tutoring and continue with progress monitoring.
 - Students with inadequate slopes or end levels remain in tertiary prevention (Tier 3) and continue progress monitoring.

RTI Within a Reading Framework: An Example of Tier 2, Secondary Prevention Tutoring

The following describes a first-grade RTI project in reading that was conducted by Doug Fuchs, Don Compton, and Lynn Fuchs in Nashville, Tennessee.

The study results indicated that the secondary prevention tutoring resulted in improved performance on word identification, reading fluency, and comprehension. LD prevalence was also lower among tutored students.

Let's look at the secondary prevention tutoring program to determine crucial elements of an effective reading program at the secondary prevention level.

The tutoring took place in groups of two to four students. The tutoring took place four times a week for 9 weeks, and it occurred outside of the regular education classroom. During each session, students participated in 45 minutes of tutor-led instruction. The 45 minutes were divided in this way:

10 minutes of sight word practice

5 minutes of letter sounds practice

15 minutes of decoding practice

15 minutes of reading fluency practice

Figure 46 shows the beginning sequence of reading tutoring lessons. The sight words, sounds, decoding activities, and stories covered in each tutoring session are detailed on the sequence.

The steps included in the sight words, sounds, and decodable words activities included introducing a new sound or word, choral practice, individual practice, and writing practice. Individual practice included two opportunities to produce correct sounds or words. Even as students are introduced to new sight words and sounds, old sight words and sounds are continually practiced.

Figure 46: Reading Tutoring Sequence—First 4 Weeks

Sounds and Words Lesson Sequence: First Grade Tutoring 2002-2003							
TUTORING WEEK	TUTORING SET	TUTORING NEW SIGHT WORDS	TUTORING NEW SOUNDS	TUTORING OLD SIGHT WORDS	TUTORING OLD SOUNDS	TUTORING DECODABLE WORDS	STORY
1	1	and, is	a, m, t, s			am, Sam, at	Sam pg 2
	2	the				mat, sat, am, Sam, at	Tat
	3	I				mat, sat, am, Sam, at	Sam pg 2
	4	on	c			cat, mat, sat, am, Sam, at	Fat Cat
2	5	with				cat, mat, sat, am, Sam, at	Tat
	6		b			bat, cat, mat, sat, am, Sam, at	Sam at Bat
	7	have	i			sit, bit, bat, cat, mat, sat, am, at	Tab
	8		f			fit, fat, sit, bit, bat, cat, mat, sat	At Bat pg 13
3	9	find	n	have, with, on, I, the, and, is	f, i, b, c, a, m, t, s	tan, fan, can, fit, fat, sit, bit, bat	Tan
	10	has	d	find, have, with, on, I, the, and, is	n, f, i, b, c, a, m, t	sad, mad, tan, fan, can, fit, fat, sit	Ham, Jam
	11	one		has, find, have, with, on, I, the, and	d, n, f, i, b, c, a, m, t	Dan, sad, mad, tan, fan, can, fit, fat	At Bat pg 12
	12	two	r	one, has, find, have, with, on, I, the	d, n, f, i, b, c, a, m	rat, ram, sad, mad, tan, fan, can, fit	Sam pg 7
4	13	said		two, one, has, find, have, with, on, I	r, d, n, f, i, b, c, a, m	rat, ram, sad, mad, tan, fan, can, fit	Sam pg 11
	14	see	o	said, two, one, has, find, have, with, on	r, d, n, f, i, b, c, a	Tom, rat, ram, sad, mad, tan, fan, can	The pg 5
	15	was	g	see, said, two, one, has, find, have, with	o, r, d, n, f, i, b, c	bag, rag, nag, dog, rat, ram, sad, mad	A Tin Pig p 25
	16	be		was, see, said, two, one, has, find, have	g, o, r, d, n, f, i, b, c	bag, rag, nag, dog, rat, ram, sad, mad	Jam pg 8

All the lessons conducted by the tutor were scripted to ensure that all students were tutored in a similar manner. Figure 47 shows a sample script from the reading tutoring.

Figure 47: Sample Reading Tutoring Script**GROUP TUTORING**ACTIVITIES

Before beginning a tutoring session, materials should be ready:

Materials that you'll need are listed under each activity. Make sure you have all the appropriate materials, and that your sounds, words, and stories match up with those in the lesson sequence.

NOTE: For all activities:

- **Listen carefully to the group to make sure you catch and correct individual errors during choral response activities.**
- **Keep a brisk pace.**
- **Stay organized: as soon as you are finished with a set of cards, put them up in the appropriate envelopes.**
- **If a student is having difficulty, always model the item for the student, then have them repeat it: "Listen to me. Appropriate prompting strategies."**
- **If a student is echoing other students in the other group, call on the student individually, so they can get an extra opportunity to practice.**
- **Positively reinforce the students in the group who are on-task. Use points to direct students towards desirable behaviors, rather than using them as a threat to students who are exhibiting undesirable behaviors.**
- **If students were off-task for most of the activity, you do not need to award them points. Awarding points is up to your discretion. You may choose to only award points to students who were on-task.**
- **Be on the lookout for any positive behaviors from students who typically misbehave. Try to "catch them doing good." Award points generously whenever they are doing what they should be doing.**
- **If students are asking questions, keep your answers in response as brief as possible and quickly re-direct them back on-task.**

SIGHT WORDS - 10 minutes

Materials:

- Sight word cards—one set for each student
- Student notebooks
- Point sheets

Set Count-up timer.

Set Countdown timer for 8 minutes.

Introduce new sight word.

1. To introduce new words: "Let's look at our new word for today. I'm going to say it and then spell it"
2. Show each new word card and say, "This word is 'the.' What word?"
3. All 3 students should respond chorally, "The."
4. Point to the word card and say, "Say this after me. 'The,' 't' – 'h' – 'e.'"
5. All 3 students should respond chorally, "The, 't' – 'h' – 'e.'"
6. Repeat steps 2 – 5 if there are other new sight words.

Review new sightword from previous lesson if there is not a new sight word.

7. To review new words: "Let's look at our new word from last time. I'm going to say it and then spell it"
8. Show each new word card and say, "This word is 'the.' What word?"
9. All 3 students should respond chorally, "The."
10. Point to the word card and say, "Say this after me. 'The,' 't' – 'h' – 'e.'"
11. All 3 students should respond chorally, "The, 't' – 'h' – 'e.'"
12. Repeat steps 7 – 11 if there are other new sight words from the previous set to review.

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Checklists were used to calculate fidelity. Figure 48 shows the Fidelity Checklist for the Sounds part of the lesson.

Figure 48: Fidelity Checklist—Sounds

+	-	NA	
			The tutor introduces the new sight word, or if there is no new word, introduces the sight word from the previous set. The tutor states the sight word and spells it.
			The tutor asks the students to repeat the sight word and spell it.
			The tutor asks students to state chorally each sight word in the set (“What word?”)
			If the students say a word incorrectly, the tutor says the correct word and the student repeats it.
			The tutor presents each sight word to each student individually and asks the student to state the word.
			If the students say a word incorrectly, the tutor says the correct word and asks the student to repeat it.
			The tutor repeats steps 5 and 6 with any sight words said incorrectly on the first trial.
			The tutor asks students to state the sight word for the day.
			Tutor asks students to write the new sight word.
			If the student has written the sight word correctly, the tutor states that it is correct and asks the student to write the word again. Tutor repeats this step with each of the students.
			If a student has difficulty writing the sight word, the tutor shows the sight word again and instructs the student to write it.
			If any words are misread on the second trial, the tutor marks on the mastery sheet that the group will repeat the entire set.

Student mastery on the session's sight words was assessed each day. Each student had two trials to master sight words and sounds during each session. If every student achieved mastery of sight words and sounds on the first day of that set, then the group moved to the next set on the following day. The group progressed to the next sight words and sounds set regardless of mastery status after two sessions on the same set to ensure that the group would be able to cover more words and sounds. Figure 49 shows a master set of sight words that were copied and cut into flash cards. Figure 50 shows the mastery checklist.

Figure 49: Sample Master Set

Set 64 starts here		
over	soon	old
put	came	were
when	white	take
aw	ar	ir

Figure 50: Tutoring Mastery Checklist

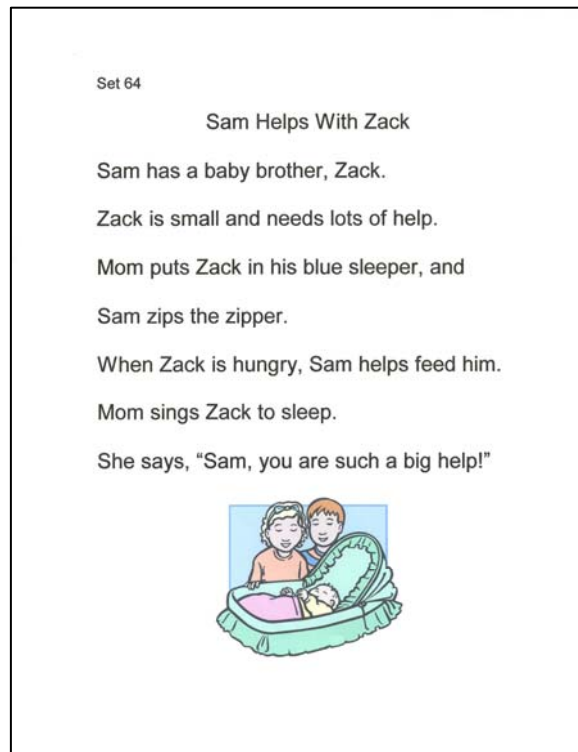
DATA SHEET FOR RECORDING STUDENT SET						
Students: _____		Teacher: _____				
_____		Tutor: _____				

<p>Criteria: The first time a group has worked with a particular set: If any of the students still have any cards in the "Practice" pile after the second round of individual responses on the SIGHT WORDS, the entire group will repeat that set again. Write an "R" if the group needs to repeat a set. If none of the students have cards in the "Practice" pile after the second round of individual responses on the SIGHT WORDS, write a "✓". The group will start the next set during the next tutoring session.</p> <p>If it is the second time a group has worked with a particular set: Write a "✓". The group will start the next set during the next tutoring session.</p>						
Session #	Date	Set	Repeat or ✓ Move on	Did not master during session	Absent	Did a student's behavior interfere with their own or other's learning process? If so, please make brief comments (e.g. defiant, inattentive, etc.)
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Story activities for each lesson included choral reading of a previously-read story, choral reading of a new story, and individual speed reading. The choral reading involved echoing the tutor one line at a time and then choral reading of the entire story. The individual speed reading had each student read the new story three times for 30 seconds, and students had the opportunity to earn incentives for increasing reading fluency.

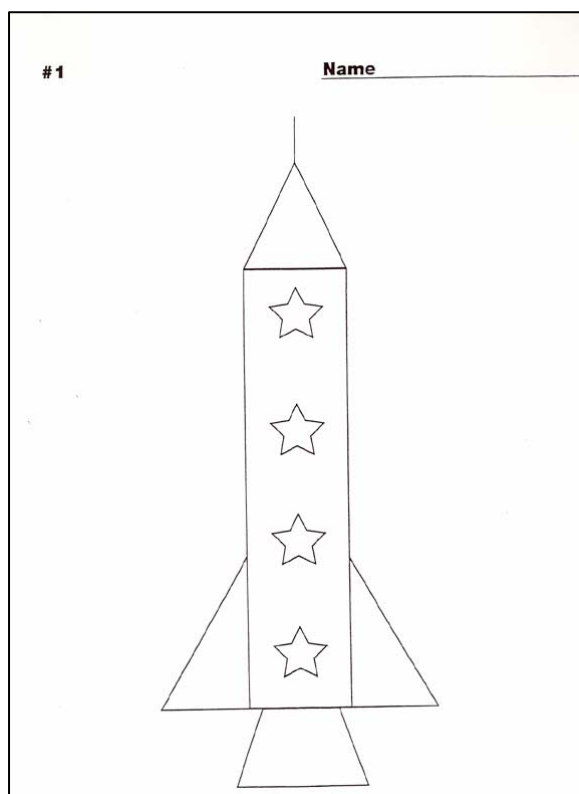
Figure 51 shows a story that students use to practice fluency.

Figure 51: Sample Tutoring Story



The speed game to improve reading fluency encouraged students to read three separate times for 30 seconds each time. If a student read farther on the second or third try compared to the first reading, they filled in a star on a star chart. (See Figure 52.) Incentives were given when all stars on the Star Chart were filled in.

Figure 52: Sample Star Chart



RTI Within a Math Framework: An Example of Tier 2, Secondary Prevention Tutoring

The following describes a first-grade RTI project conducted by Lynn Fuchs, Don Compton, Doug Fuchs, and Kim Paulsen in Nashville, Tennessee.

The study results indicated that the tutoring program resulted in improved performance on math calculations, concepts and applications, and word problems. LD prevalence was lower among tutored students at the end of first and second grades.

Let's look at the math tutoring to determine crucial elements to an effective math tutoring program.

The tutoring took place in small groups of two to three students. Tutoring was conducted three times a week outside of the student's regular education classroom for 16 weeks. Each session consisted of 30 minutes of tutor-led instruction along with 10 minutes of computer basic facts practice. The tutor-led instruction followed the concrete-representational-abstract model which relied on concrete objects to promote conceptual understanding.

Figure 53 lists the 17 topics covered during the tutoring program. Mastery of the sessions' topic was assessed each day. If every student in the group achieved mastery prior to the last day of the topic, the group moved to the next topic. For mastery assessment, students completed worksheets independently, with a percentage of correct answers determining mastery. On the

first day of each new topic, students completed a cumulative review worksheet covering previous topics.

Figure 53: Math Tutoring Topics

- Identifying and writing numbers to 99
- Identifying more, less, and equal with objects
- Sequencing numbers
- Using $<$, $>$, and $=$ symbols
- Skip counting by 10s, 5s, and 2s
- Understanding place value
- Identifying operations
- Place value (0–50)
- Writing number sentences
- Place value (0–99)
- Addition facts (sums to 18)
- Subtraction facts (minuends to 18)
- Review of addition and subtraction facts
- Review of place value
- Two-digit addition (no regrouping)
- Two-digit subtraction (no regrouping)
- Missing addends

Tutors followed scripts that addressed number concepts, numeration, computation, and story problems. Figure 54 shows a sample script from a lesson on place value.

Figure 54: Sample Tutoring Script (Place Value)

Topic 7
Place Value
Day 1

Objectives

Students will:

Identify tens and ones place value

Materials

Review sheet 6
Topic 7, Day 1, Tutoring Sheet 1
Topic 7, Day 1, Tutoring Sheet 2
Base 10 Blocks
Paper
Pencil
Point Sheet

Note to Tutors: Topic 7 continues to work on place value. The same skill is taught in all 3 days. The mastery criteria is 9/9 on Tutoring Sheet 2. This skill is very important for students to understand. Not only should they get 9/9 for mastery, but should be able to complete the problems fluently. If students receive 9/9 on Day 1 or Day 2 but you feel they could be quicker, please continue with Day 3.

Mastery Criteria: *Topic 7 Day 1 Tutoring Sheet 2: 9/9.*

Tutor: **The first thing we need to do today is complete this review sheet. I'll read the questions and you write the answers.**

Read directions and allow time for students to answer.

Today we'll continue working on place value. Last time we looked at rods and cubes on paper and wrote the number. Today, I'm going to show you rods and cubes and you're going to draw the numbers. Let me show you what I mean.

Give students Topic 7, Day 1, Tutoring Sheet 1.

Put 2 rods and 4 cubes in front of students.

Look, we have 2 rods (point). What do rods mean?

If students give incorrect answer, tutor says **rods mean 10. What do rods mean?**

Students: 10.

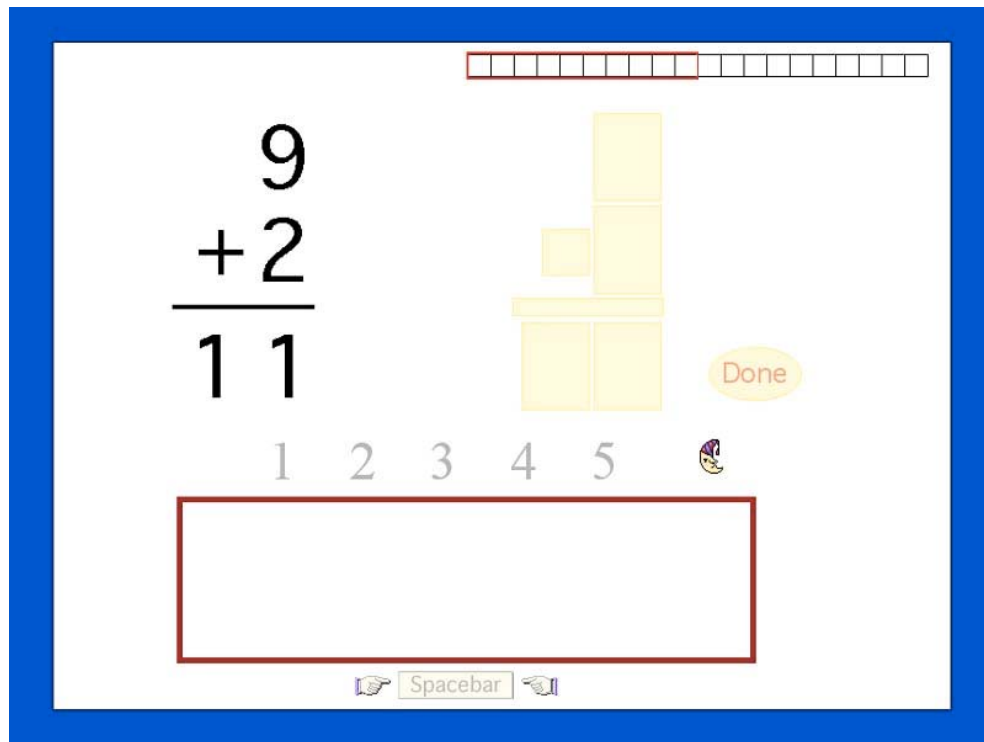
Figure 55 shows a sample tutoring sheet that students completed during a tutoring session.

Figure 55: Sample Math Tutoring Sheet (Sequencing Numbers)

<p style="text-align: center;">8</p> <p>_____ is the number before 8.</p> <p>The number after 8 is _____.</p>	<p style="text-align: center;">17 _____ 19</p> <p>_____ is the number between 17 and 19.</p>
<p style="text-align: center;">40</p> <p>_____ is the number before 40.</p> <p>The number after 40 is _____.</p>	<p style="text-align: center;">34</p> <p>_____ is the number before 34.</p> <p>The number after 34 is _____.</p>
<p style="text-align: center;">35 _____ 37</p> <p>_____ is the number between 35 and 37.</p>	<p style="text-align: center;">24 _____ 26</p> <p>_____ is the number between 24 and 26.</p>

The computer basic facts practice is seen in Figure 56. The computer flashed a math fact on the left-hand side of the computer screen, and the student typed the fact from short-term memory on the right-hand side of the computer screen. A number line at the top of the screen assisted the student in solving the math fact. Students earned points for math facts recalled correctly, and they had to correct facts answered incorrectly. Each student worked individually on the computer game for 10 minutes at the end of each tutoring session.

Figure 56: Sample Computer Math Program



Case Study #1: Fenwick School—Dewey and Dolphina

This first part of this case study outlines how Fenwick School implements RTI at first grade. The second and third parts introduce two students, Dewey and Dolphina, and their experiences within the RTI model.

Fenwick School

Fenwick School uses a three-tier RTI model. Tier 2, secondary prevention, separates general education (primary prevention) from special education (tertiary prevention). Primary prevention general education is deemed “generally effective” for three reasons.

First, every first-grade teacher uses a strong research-based reading curriculum. Second, Fenwick’s lead reading teacher observes each first-grade teacher implementing the reading curriculum quarterly and has documented fidelity of implementation. Thus, Fenwick’s first-grade primary prevention reading program is derived from teachers’ track records. That is, the previous year’s first-grade students, on average, demonstrated a strong slope of improvement (i.e., an average increase of 1.8 words per week on CBM Word Identification Fluency [WIF]). Moreover, during the previous year, only 3 of 60 (i.e., 5%) first graders failed to achieve end-of-year CBM benchmarks of 60 words read correctly in 1 minute.

Tier 1 – Primary Prevention

Fenwick combines universal screening with 6 weeks of short-term PM to identify students for secondary prevention tutoring (Tier 2). At first grade in reading, Fenwick uses CBM-WIF as its RTI measure. All first-grade students are screened in September of two alternate forms of CBM-WIF, averaging performance across the two forms.

At the beginning of Grade 1, Fenwick School uses a CBM-WIF cut-off of 15 for designating suspected risk for reading failure. (Any student scoring lower than 15 is deemed likely to experience serious reading difficulty unless the student receives intervention.) Suspected at-risk students are monitored for 6 weeks to gauge their response to primary prevention general education.

During the 6 weeks, Fenwick assesses suspected at-risk students once a week using different forms of CBM-WIF. Fenwick uses a CBM-WIF slope of one word increase per week to designate positive response. Any student who does not meet this criterion for growth in primary prevention is targeted for secondary prevention (Tier 2).



Tier 2 – Secondary Prevention

Fenwick School relies on a standard protocol for secondary prevention tutoring. The tutoring is modeled after a validated reading tutoring protocol at first grade. In Tier 2, students receive 45 minutes of instruction four times a week. Students are tutored in groups of three students for 15 weeks. The tutors are trained paraprofessionals who are observed once each week by the lead reading teacher and receive corrective feedback. Also, once each week, the lead reading teacher meets with all tutors to examine students' CBM-WIF graphs and problem solve tutoring difficulties.

Tutoring sessions focus on phonological awareness, letter sound recognition, sight word recognition, and short-story reading. Instruction is highlight explicit, and self-regulated learning strategies are used to increase student motivation and learning.

For monitoring response to secondary prevention, Fenwick School measures at-risk students weekly, each time of a different form of CBM-WIF. Scores are graphed, and slopes are calculated at the end of the 15 weeks of tutoring. Based on current research, students who improve at least one word per week are responsive to treatment. Students who improve less than one word per week are unresponsive to treatment.

Students who are unresponsive to secondary prevention receive a comprehensive evaluation and may be designated as having a disability (due to their lack of growth to a research-validated standard treatment to which the vast majority of students can be expected to respond). Written parental consent is obtained for these unresponsive students to have a comprehensive evaluation so that:

- a. Specific questions that arise during primary prevention and secondary prevention tutoring can be answered.
- b. Distinctions among LD, mild mental retardation, language impairment, and emotional behavior disorders may be formulated.

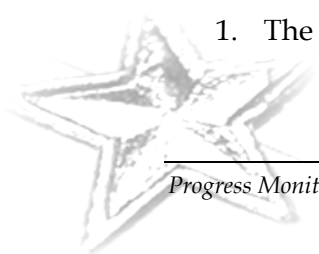
The two-subtest Wechsler Abbreviated Scale of Intelligence and the Vineland Adaptive Rating Scale are administered to distinguish between LD and mental retardation; language measures are given to distinguish between LD and language impairment; and brief rating scales, classroom observation, and parent interviews are collected to distinguish between LD and emotional behavior disorders.

Tier 3 – Tertiary Prevention

Special education represents a vital tier within Fenwick's three-tier system. The special education staff incorporate formative decision making based on ongoing PM to design individually-tailored special education programs. The goal is to use PM to formulate a program that is effective for the student whose response to the standard treatment is poor.

The key distinctions between secondary and tertiary prevention are:

1. The special educators rely on lower student-teacher ratios (typically 1:1 or 1:2).



2. Provide more instructional time (up to 1.5 hours per day).
3. Systematically use ongoing PM to formulate individually tailored programs.

Fenwick's Tier 3 tertiary prevention special education is a flexible service: it permits exit and reentry as the student's needs change in relation to the demands of the general education curriculum.

Dewey

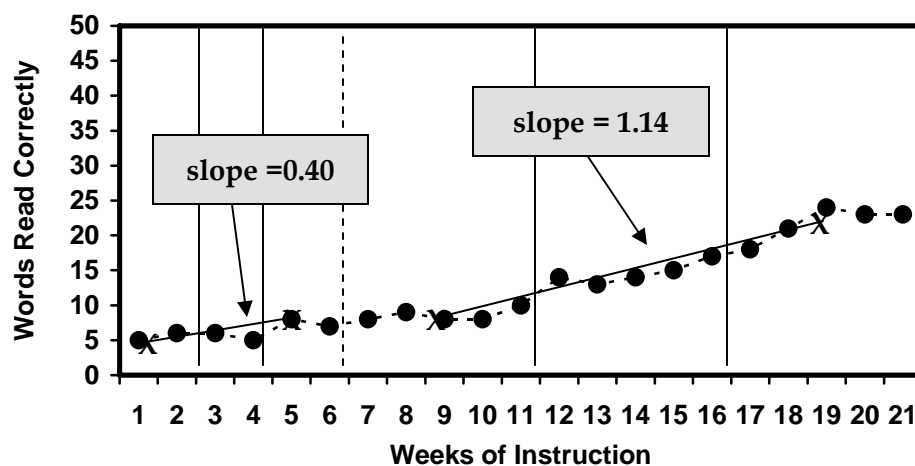
On the September screening for suspected at-risk students, Dewey's average score across two forms of CBM-WIF was 5.5. This score fell below the cut-off (15) for designating risk for reading failure. So, Dewey was suspected of being at risk, and his performance was monitored via CBM-WIF for 6 weeks to gauge response to primary prevention (Tier 1) general education.

At the end of 6 weeks, Dewey's CBM-WIF slope was $(7 - 5) \div 5 = 0.4$, which fell below the 1.0 criterion for positive response. So, Dewey was deemed unresponsive to primary prevention. Written parental consent was obtained for Dewey to enter secondary prevention tutoring.

Secondary prevention tutoring was conducted four times a week in groups for 15 weeks. Each session lasted 45 minutes. CBM-WIF data were collected weekly, each time with an alternate form, over the course of tutoring. Under secondary prevention, Dewey's slope was $(23 - 7) \div 14 = 1.14$. This exceeded the 1.0 criterion for positive response.

Figure 57 shows Dewey's CBM scores in primary prevention (to the left of the dotted line) and secondary prevention (to the right of the dotted line).

Figure 57: Dewey's CBM Graph—Primary and Secondary Prevention



Dewey was deemed responsive to secondary prevention tutoring and was not classified as LD. Dewey returned to primary prevention, with the hope that he would now be ready to profit there. Weekly PM continues to gauge response so that Dewey could reenter secondary prevention Tier 2 tutoring if response to primary prevention again proved inadequate.

Dolphina

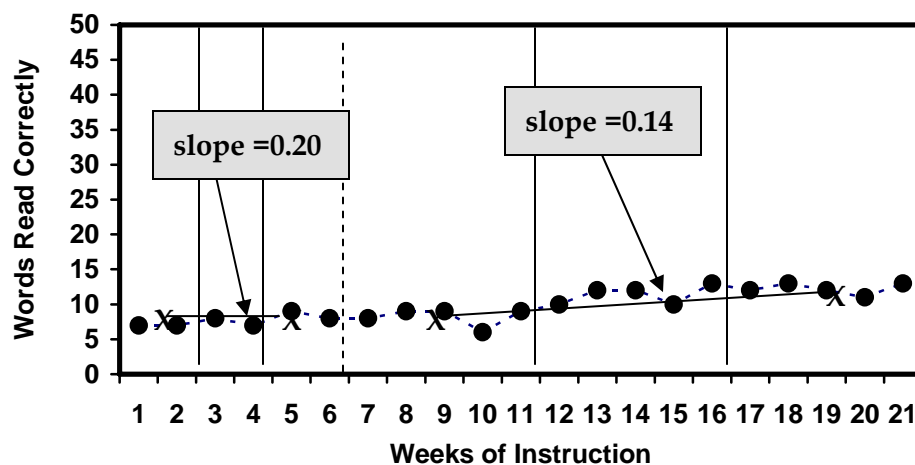
On the September screening for suspected at-risk students, Dolphina's average score across two forms of CBM-WIF was 7.5. This score fell below the cut-off (15) for suspecting risk for reading failure in first grade. So, she was suspected at risk for reading failure, and her performance was monitored via CBM-WIF for 6 weeks to gauge response to primary prevention.

At the end of 6 weeks, Dolphina's CBM-WIF slope was $(7 - 6) \div 5 = 0.2$, which fell below the 1.0 criterion for positive response. So, Dolphina was deemed unresponsive to primary prevention. Parental consent was obtained for Dolphina to enter secondary prevention tutoring.

Dolphina's tutoring was conducted similar to Dewey's tutoring. In response to secondary prevention (Tier 2) tutoring, Dolphina's slope was $(10 - 8) \div 14 = 0.14$, well below the 1.0 cut-off for positive response. So, she was deemed unresponsive to secondary prevention, indicating the possible presence of a disability.

Figure 58 shows Dolphina's CBM-WIF scores from primary prevention (left of dotted line) and secondary prevention (right of dotted line).

Figure 58: Dolphina's CBM Graph—Primary and Secondary Prevention



Written parental consent was obtained for a comprehensive evaluation of Dolphina. To formulate questions for the evaluation, Dolphina's Tier 1 (primary prevention) general education teacher and Tier 2 (secondary prevention) tutor were interviewed. The evaluation also involved the Vineland Adaptive Rating Scale and the two-subtest Wechsler Abbreviated Scale of Intelligence, which ruled out mental retardation; expressive and pragmatic language measures, which suggested typical language development; and brief rating scales, classroom observations, and parents interviews, which eliminated the possibility of an emotional behavioral disorder.

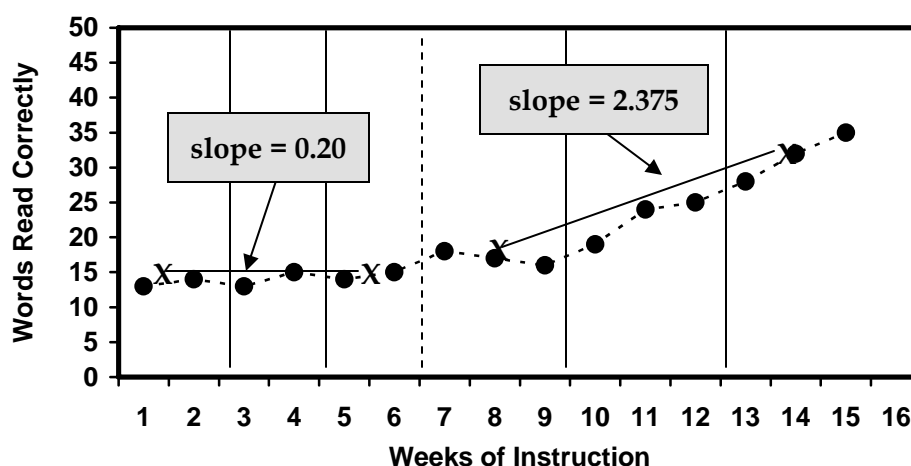
Dolphina was, therefore, classified as LD. She entered tertiary prevention, or Tier 3. The special educator, Mrs. Easterly, examined Dolphina's CBM-WIF, considered the information revealed by the primary prevention general educator and the secondary prevention tutor during interviews, and considered the evaluation data to set IEP goals and formulate an initial special

education tutoring program for Dolphina. Mrs. Easterly implemented this program, working one-on-one with Dolphina each day for 1 hour and supplementing the hour each day with another half-hour small-group tutoring session with one other student.

Mrs. Easterly collected CBM-WIF on Dolphina twice weekly. She set a goal of 1.5 words improvement each week. After 6 weeks, Mrs. Easterly inspected the CBM-WIF graph and noted that the slope of improvement fell below that goal. Dolphina's slope was $(13 - 12) \div 5 = 0.2$. So, a program change was initiated with the hope of increasing Dolphina's rate of growth. In this way, over a period of 3 months, Mrs. Easterly boosted Dolphina's slope to $(33 - 14) \div 8 = 2.375$. Dolphina's slope was increasing 2.375 words per week.

Figure 59 shows Dolphina's CBM graph in tertiary prevention. The dotted line signifies the point at which Mrs. Easterly changed Dolphina's special education program to hopefully increase Dolphina's rate of growth.

Figure 59: Dolphina's CBM Graph—Tertiary Prevention



When Dolphina met the end-of-year CBM-WIF benchmark 1 month late (for a total of approximately 4.5 months of special education), she returned to Tier 1 general education where her response was monitored with weekly CBM-WIF.

Case Study #2: Bear Lake School—Nina and Ethan

The first part of this case study explains how RTI is implemented at Bear Lake School. The second and third parts detail students Nina and Ethan and how RTI works for them.

Bear Lake School

Bear Lake, like Fenwick, uses the widely-researched three-tier RTI model. Nina and Ethan are second-grade students who are struggling with math in the general education classroom. All the second-grade teachers use a strong research-based math program. Implementation fidelity

of the math program is very high. Last year, only 5% of second-grade students failed to achieve end-of-year CBM Computation benchmarks.

Tier 1 – Primary Prevention

Bear Lake School uses CBM Computation as its RTI measure. All second-grade students are screened in September using two alternate forms for CBM Computation, averaging performance across two forms. The cut-off for suspecting students at risk for math failure on CBM Computation is 10. (See Figure 26 for CBM Computation suspected to be at-risk cut-off points.)

QUESTION: Look at Figure 60. Based on these CBM Computation scores, which students in Mr. Bingham’s class should be suspected of being at risk for math failure?

Figure 60: CBM Computation Scores for Mr. Bingham’s Class

Student	CBM Score	Student	CBM Score
Marcie	13	Cheyenne	13
Anthony	12	Marianne	18
Deterrious	15	Kevin	19
Amy	18	Dax	13
Matthew	11	Ethan	6
Calliope	16	Colleen	21
Noah	25	Grace	14
Nina	8	Cyrus	20

ANSWER: Nina and Ethan scored below 10, so they would be suspected of being at risk for math failure.

At Bear Lake School, the suspected at-risk students are monitored for 7 weeks to check their response to primary prevention. During the 7 weeks, suspected at-risk students are administered CBM Computation weekly. A CBM Computation slope above 0.20 designates positive response to Tier 1.

QUESTIONS: What happens to students who meet the slope cut-off of 0.20? What happens to students who do not meet the slope cut-off of 0.20?

ANSWERS: At-risk students with CBM slopes greater than 0.20 are responders to primary prevention. These students remain in general education. At-risk students with CBM slopes less than 0.20 are nonresponders to primary prevention. These students move to Tier 2 (secondary prevention) tutoring.

Tier 2 – Secondary Prevention

Bear Lake uses a standard tutoring program for secondary prevention tutoring. The tutoring instructs students for 16 weeks in a small-group setting. Student groups work with a tutor three times a week for 30 minutes a session. Tutoring sessions focus on number concepts, basic math facts, addition and subtraction of two-digit numbers, word-problem solving, and missing addends.

QUESTIONS: Who administers the tutoring sessions? What type of activities should make sure the tutoring program is implemented correctly?

ANSWERS: Trained paraprofessionals serve as the tutors for the Tier 2 intervention. To make sure the tutoring program is implemented correctly, tutors should meet on a weekly basis to trouble shoot tutoring problems and examine student CBM Computation graphs.

During tutoring, Bear Lake measures at-risk students weekly using alternate forms of CBM Computation. Student scores are graphed, and slopes are calculated at the end of secondary prevention tutoring.

QUESTION: Look at Figure 61. What cut-off points should Bear Lake use during secondary prevention?

Figure 61: Quantifying Response to Tier 2 Math

Grade	Computation		Concepts and Applications	
	< Slope	< End Level	< Slope	< End Level
Grade 1	< 0.50	< 20 digits	< 0.40	< 20 problems
Grade 2	< 0.40	< 20 digits	< 0.40	< 20 problems
Grade 3	< 0.40	< 20 digits	< 0.70	< 20 problems
Grade 4	< 0.70	< 20 digits	< 0.70	< 20 problems
Grade 5	< 0.70	< 20 digits	< 0.70	< 20 problems
Grade 6	< 0.70	< 20 digits	< 0.70	< 20 problems

ANSWER: For second-grade students assessed on CBM Computation, Bear Lake could use two different cut-off points. Students who have slope improvement greater than 0.40 or an end-level score of at least 20 are responsive to secondary prevention tutoring. Students who improve less than 0.40 or an end-level score below 20 are classified as unresponsive to secondary prevention tutoring.

Students who are unresponsive to secondary prevention may have a disability (due to their lack of growth in response to a research-validated standard treatment to which the vast majority of students can be expected to respond). Written parental consent is obtained for these unresponsive students to have a comprehensive evaluation so that primary and secondary

prevention questions can be answered, and distinctions among LD, mild mental retardation, language impairment, and emotional behavior disorders can be formulated.

The two-subtest Wechsler Abbreviated Scale of Intelligence and the Vineland Adaptive Rating Scale are administered to distinguish between LD and mental retardation; language measures are given to distinguish between LD and language impairment; and brief rating scales, classroom observation, and parent interviews are collected to distinguish between LD and emotional behavior disorders.

Tier 3 – Tertiary Prevention

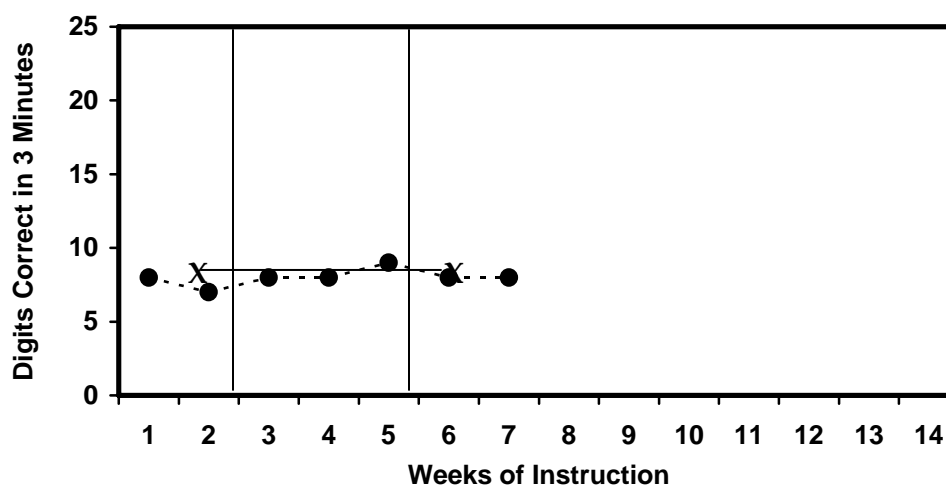
At Bear Lake, special education teachers use PM to develop appropriate IEP goals and individually-tailor special education programs. Like Fenwick School, Bear Lake's tertiary prevention special education is a flexible service: it permits exit and reentry as student needs change in relation to the demands of the general education curriculum.

Nina

On the September screening, Nina's average score across two CBM Computation forms was 8. As discussed before, this score was below the cut-off for suspecting students of being at risk for math failure. Nina's performance was monitored using CBM Computation for 7 weeks to gauge response to primary prevention.

QUESTION: Look at the graph in Figure 62. What is Nina's CBM slope at the end of 7 weeks of primary prevention?

Figure 62: Nina's CBM Computation Graph in Primary Prevention (Tier I)



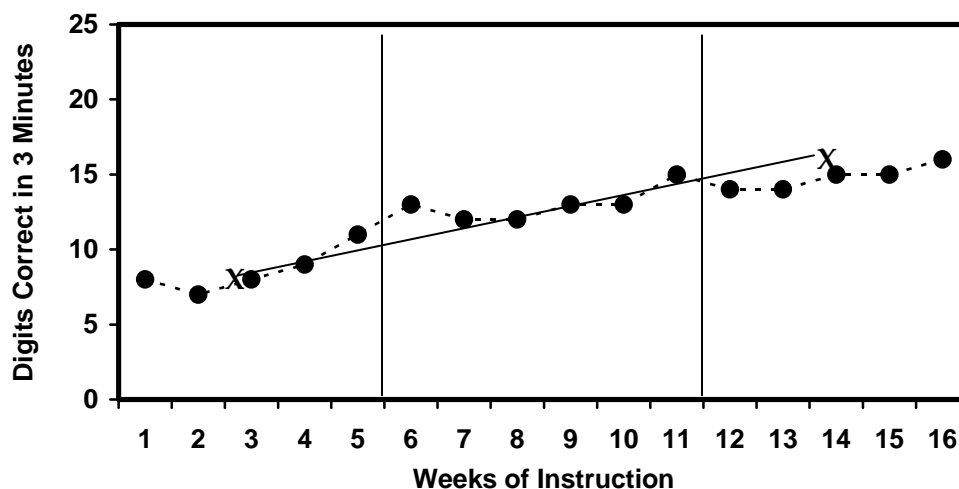
ANSWER: At the end of 7 weeks, Nina's CBM Computation slope was $(8 - 8) \div 7 = 0.0$. This fell well below the 0.20 criterion for positive response.

QUESTION: So, what should happen to Nina?

ANSWER: With a slope of less than 0.20, Nina was deemed unresponsive to primary prevention, so she should transition to secondary prevention tutoring.

Secondary prevention tutoring was conducted three times a week for 16 weeks. CBM Computation data were collected weekly over the course of tutoring. Figure 63 shows Nina's progress over the 16 weeks.

Figure 63: Nina's CBM Computation Graph in Secondary Prevention (Tier 2)



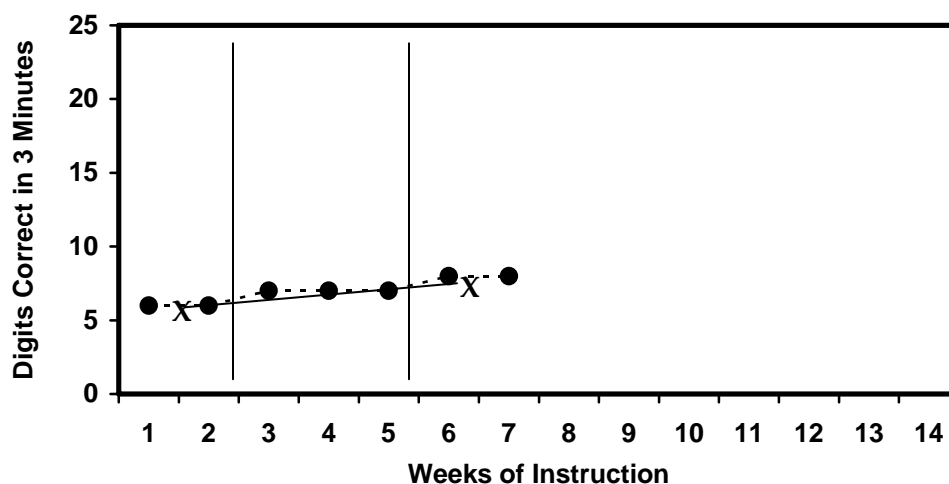
QUESTION: Based on this graph, what is Nina's slope during secondary prevention? What decisions should be made about Nina?

ANSWER: Nina's slope over Tier 2 tutoring was $(14 - 7) \div 15 = 0.46$. This slope exceeded the secondary prevention cut-off of 0.40 for positive response. Nina has been responsive to secondary prevention tutoring, and she does not have a disability. Nina would return to primary prevention, and weekly PM would be used to monitor Nina's progress in Tier 1.

Ethan

On the September screening, Ethan's average score across two CBM Computation forms was 6. This score was below the cut-off (10) for suspecting second-grade students of being at risk for failure. Ethan's performance was monitored using CBM Computation for 7 weeks to gauge response to primary prevention.

QUESTION: Look at the graph in Figure 64. What is Ethan's CBM slope at the end of 7 weeks of primary prevention?

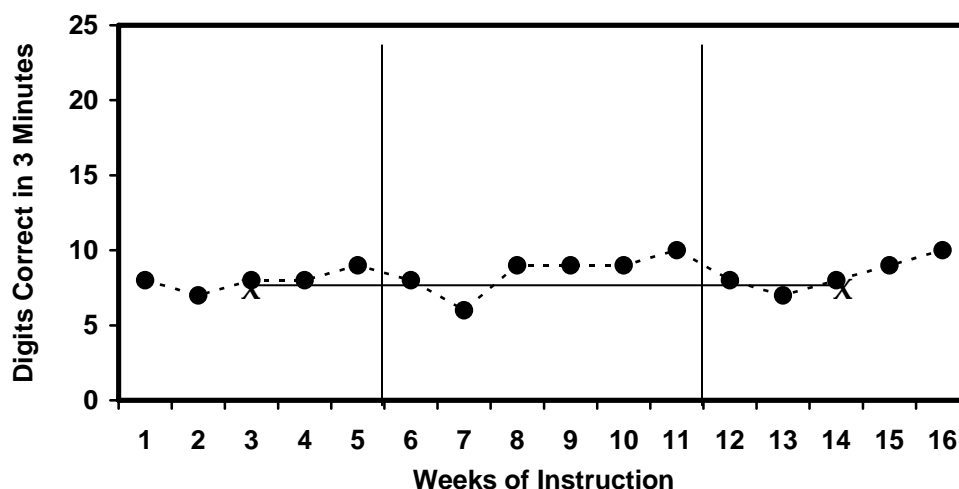
Figure 64: Ethan's CBM Computation Graph in Primary Prevention (Tier I)

ANSWER: At the end of 7 weeks, Ethan's CBM Computation slope was $(8 - 6) \div 7 = 0.14$. This fell well below the 0.20 criterion for positive response.

QUESTION: What happens when Ethan's slope falls below the cut-off point after 7 weeks of primary prevention?

ANSWER: With a slope of less than 0.20, Ethan is unresponsive to primary prevention. He should enter secondary prevention tutoring.

Secondary prevention tutoring was conducted three times a week for 16 weeks. CBM Computation data were collected weekly over the course of tutoring. Figure 65 shows Ethan's progress over the 16 weeks.

Figure 65: Ethan's CBM Computation Graph in Secondary Prevention (Tier 2)

QUESTION: Based on this graph, what is Ethan's slope during secondary prevention? What decisions should be made concerning Ethan's progress in secondary prevention tutoring?

ANSWER: Ethan's slope over secondary prevention tutoring was $(8 - 8) \div 15 = 0.0$. This slope is below the secondary prevention cut-off of 0.40 for positive response. Ethan has been unresponsive to secondary prevention tutoring. Ethan should transition to tertiary prevention (Tier 3) to receive the individualized special education programs he needs.

So, Ethan moves to tertiary prevention. A comprehensive evaluation of Ethan is conducted.

QUESTION: What does the comprehensive evaluation entail? What information does the evaluation use to understand Ethan better?

ANSWER: The comprehensive evaluation of Ethan takes place to answer questions that arose in primary and secondary prevention and consider the disability classification of Ethan. It also administers standard screening measures (such as the Wechsler Abbreviated Scale of Intelligence) to determine what disability classification, if any, is appropriate for Ethan.

Ethan was administered the Vineland Adaptive Rating Scale and the two-subtest Wechsler Abbreviated Scale of Intelligence, and his results ruled out mental retardation. Expressive and pragmatic language measures were administered to Ethan, and his results ruled out speech or language disorders. Rating scales, classroom observations, and parent interviews were gathered on Ethan, and his results ruled out the possibility of an emotional behavioral disorder.

After all the above were ruled out, Ethan was classified as having a LD. He began tertiary prevention in February of the school year.

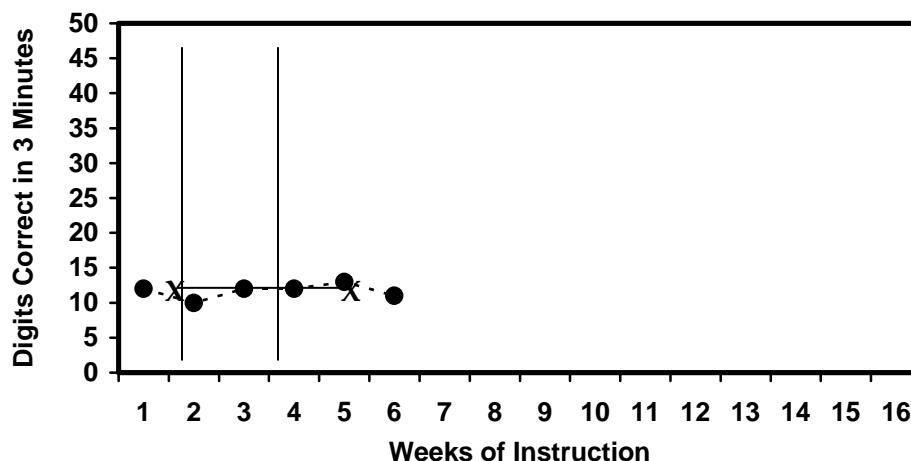
QUESTION: How is PM used for Ethan in tertiary prevention?

ANSWER: PM is used to set IEP goals for Ethan, to inductively formulate an effective individualized program for Ethan, and to help make decisions about when to exit Ethan from special education.

Ethan's teacher, Mr. Nance, worked with Ethan one-on-one for 1 hour each day. Mr. Nance set a goal of Ethan improving one digit on CBM Computation each week. After 6 weeks, Mr. Nance looked at Ethan's CBM graph.

QUESTION: What does Ethan's CBM graph (Figure 66) show after 6 weeks in tertiary prevention? What should Mr. Nance do?

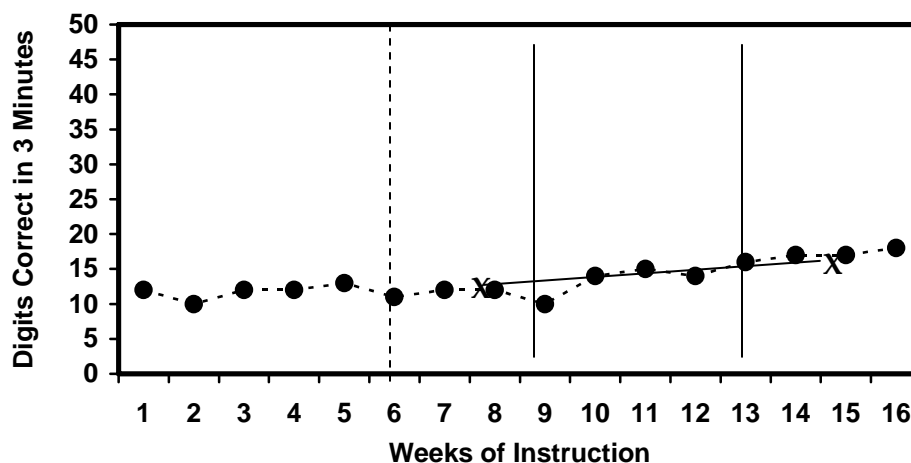


Figure 66: Ethan's CBM Graph—Tertiary Prevention

ANSWER: Ethan's CBM graph shows that he is not meeting Mr. Nance's goal of one digit of improvement per week. Mr. Nance decides to change Ethan's instructional program to hopefully increase Ethan's rate of growth.

Figure 67 shows Ethan's CBM graph in tertiary prevention. The dotted line signifies the point at which Mr. Nance changed Ethan's tertiary prevention program.

QUESTION: What has happened to Ethan's CBM graph?

Figure 67: Ethan's CBM Graph—Tertiary Prevention

ANSWER: Ethan has begun to improve under Mr. Nance's new instructional program. His growth is slow, but he seems to be benefiting from tertiary instruction.

It is now the end of the school year, and Ethan's slope is $(14 - 11) \div 9 = 0.33$. Ethan has not met the slope level of 0.40 or end level of 20 digits correct (see Figure 44). He will remain in tertiary prevention when he comes back to school as a third-grade student next fall. His progress will be

continually monitored and decisions about moving Ethan to primary or secondary prevention will be made on an ongoing basis.

Frequently Asked Questions About RTI

Will the RTI process delay identification?

The RTI process takes longer than a traditional one-step comprehensive evaluation. However, beginning at Tier 2, students are receiving services designed to remediate their learning problems. The hope is that the prevention built into RTI will reduce the identification false-positives (i.e., students incorrectly identified as having a disability because they have not received strong instruction) and help many students get on a trajectory toward successful academic outcomes. Also, RTI facilitates prevention and identification early in the primary grades (in contrast to the traditional IQ/achievement discrepancy, which often requires years of schooling before a sizeable discrepancy can accrue).

Does each student have to go through RTI or can a student have a traditional assessment?

Schools honor parent requests for a traditional one-step comprehensive evaluation, in lieu of the RTI process.

What does research-based intervention mean?

A research-based intervention constitutes a set of practices. For each of those practices, there are controlled studies (group randomized studies or single-subject studies) demonstrating the efficacy.

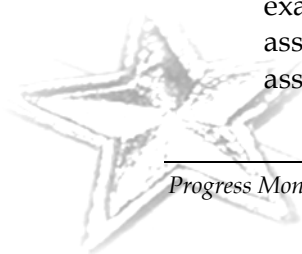
Who initiates the RTI process?

Typically, students are identified to participate in Tier 2 intervention based on their universal screening scores. Many times, such universal screening is supplemented with short-term (e.g., 5 weeks) progress monitoring to determine the student's response to general education.

What will be required for professional development?

An RTI process of LD identification will require professional development to prepare school staff to do the following activities:

- Collect and interpret screening scores using existing data or individually administered brief assessments on all students.
- Ensure the quality of general education by selecting validated curricula, by conducting observations to document the fidelity of implementing those validated curricula, by examining class-wide patterns of response to determine when teachers require assistance to improve the quality of their instructional programs, and by providing that assistance to improve the quality of teachers' instructional programs.



- Collect ongoing PM data and to interpret the data.
- Design Tier 2 programs that incorporate validated intervention protocols.
- Implement those Tier 2 programs with fidelity.

Who is responsible for the various activities required to implement RTI as a method of LD identification?

Faculty in a school building must work collaboratively to implement RTI as a method of LD identification. In some schools, the work is distributed as follows:

- Collect screening data using existing data or individually-administered brief assessments on all students: teachers and trained aides
- Interpret screening data: special educators and school psychologists
- Ensure the quality of general education: curriculum specialists at the school or district level and school psychologists
- Collect ongoing progress-monitoring data: teachers and trained aides
- Interpret progress-monitoring data: special educators and school psychologists
- Design Tier 2 programs that incorporate validated intervention protocols: special educators and school psychologists
- Implement Tier 2 programs with fidelity: trained aides under the supervision of the special educators and school psychologists
- Conduct the comprehensive evaluation: special educators and school psychologists

What proportion of students is likely to be identified as at risk (for Tier 1 monitoring) and placed in Tier 2 tutoring?

The proportion of students identified for different steps in the RTI process depends largely on the quality of general education.

When general education instruction is of questionable quality, research suggests that 20–25% of a school population is likely to be identified as at risk and demonstrate unresponsiveness to Tier 1. Of course, providing the Tier 2 diagnostic instructional trial to 25% of a school population creates resource challenges. On the other hand, research also suggests that with high-quality general education, only 9–10% of students will be identified as at risk and respond inadequately to Tier 1, with approximately half those students responding to high-quality Tier 2 instruction. Clearly, an urgency exists to ensure a high-quality general education. In a similar way, integrity of the RTI process requires a strong Tier 2 diagnostic instructional trial.



How long will the comprehensive evaluation be and what professional is likely to give the assessment?

The evaluation should be specifically targeted to answer questions that arise during Tier 2 tutoring, in collaboration with the perspective of the general educator. Typically, answering these relevant questions involves only a small number of relatively brief tests. For example, if mental retardation is suspected as the disability category, school psychologists might administer the Vineland Adaptive Behavior Scale along with a two-subtest Wechsler Abbreviated Scale of Intelligence instead of giving a full-blown intelligence test to rule out mental retardation. The special educator or school psychologist is likely to give the assessment.

Are there schools currently implementing RTI as a method of LD identification and, if so, how can I learn more about their methods?

Yes, some schools currently are implementing RTI as a method of LD identification. You can obtain a list of these model sites and information on their implementation of RTI from Daryl Mellard at dmellard@ku.edu.



Appendix A: CBM Resources

The various CBM reading and math measures may be obtained from the following sources.

AIMSweb / Edformation (Reading and Math CBM)

AIMSweb is based on CBM. It provides materials for CBM data collection and supports data use. AIMSweb measures, administration guides, scoring guides, and software are available for purchase on the Internet:

<http://www.aimsweb.com> or <http://www.edformation.com>

Phone: 888-944-1882

Mail: Edformation, Inc.

6420 Flying Cloud Drive, Suite 204

Eden Prairie, MN 55344

DIBELS (Reading CBM)

Dynamic Indicators of Basic Early Literacy Skills (DIBELS) are a set of standardized, individually administered measures of early literacy development. DIBELS measures, administration guides, scoring guides, and information on the automated Data System are on the Internet:

<http://dibels.uoregon.edu/>

Edcheckup (Reading and Math CBM)

Edcheckup offers an assessment system for screening student performance and measuring student progress toward goals in reading, based on the CBM model. Edcheckup reading passages are available for purchase on the Internet:

<http://www.edcheckup.com>

Phone: 952-229-1440

Mail: WebEdCo

7701 York Avenue South, Suite 250

Edina, MN 55435

McGraw-Hill (Reading and Math CBM)

Yearly ProgressPro™, from McGraw-Hill Digital Learning, combines ongoing formative assessment, prescriptive instruction, and a reporting and data management system to give teachers and administrators the tools they need to raise student achievement. Information on the McGraw-Hill computer software is available on the Internet:

<http://www.mhdigitalllearning.com>

Phone: 1-800-848-1567, ext. 4928

Pro-Ed, Inc. (Reading and Math CBM)

The Monitoring Basic Skills Progress (MBSP) is a computer program for automatically conducting CBM and for monitoring student progress. The computer scores the tests and provides students with immediate feedback on their progress. The software also provides teachers with individual and class-wide reports to help them plan more effective instruction. MBSP software is available for purchase on the Internet:

http://www.proedinc.com/store/index.php?mode=product_detail&id=0840

Phone: 800-897-2302

Mail: 8700 Shoal Creek Boulevard
Austin, TX 78757-6897

University of Maryland (Reading CBM)

Materials for CBM Passage Reading Fluency tests and CBM Letter Sound Fluency tests were developed and researched using standard CBM procedures. The CBM measures are free to download and use. The CBM measures, teacher scoring sheets, administration instructions, and scoring instructions are on the Internet:

<http://www.glue.umd.edu/~dlspeece/cbmreading>

Vanderbilt University (Reading and Math CBM)

CBM materials were developed and researched using standard CBM procedures. The CBM measures are free, except for copying costs and postage. The CBM measures, scoring sheets, administration instructions, and scoring instructions are available:

Phone: 615-343-4782

Mail: Flora Murray
Peabody #328
230 Appleton Place
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Appendix B: RTI Resources

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