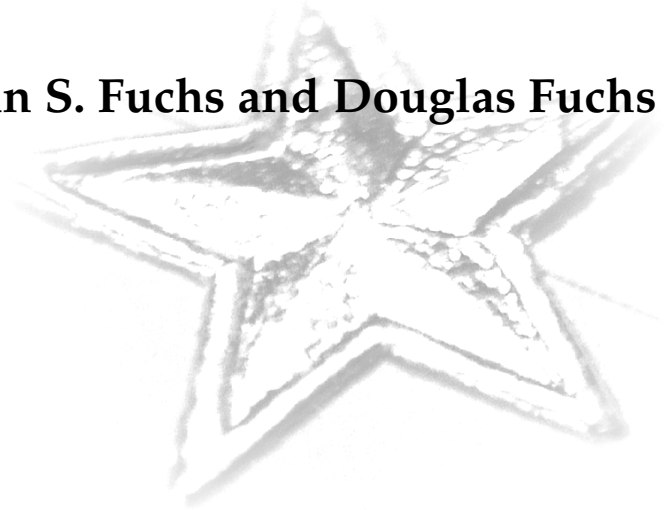
Using CBM for Progress Monitoring in Written Expression and Spelling

Lynn S. Fuchs and Douglas Fuchs



IDEAs that Work
U.S. Office of Special Education Programs

Student Progress Monitoring
studentprogress.org

Contents

Introduction to Curriculum-Based Measurement

What Is Progress Monitoring?

Progress monitoring focuses on individualized decision making in general and special education with respect to academic skill development at the elementary grades. Progress monitoring is conducted frequently (at least monthly) and is designed to

a. Estimate rates of improvement;
b. Identify students who are not demonstrating adequate progress and therefore require additional or alternative forms of instruction; and/or
c. Compare the efficacy of different forms of instruction and thereby design more effective, individualized instructional programs for problem learners.

In this manual, we discuss one form of progress monitoring: Curriculum-Based Measurement (CBM).

What Is the Difference Between Traditional Assessments and Progress Monitoring?

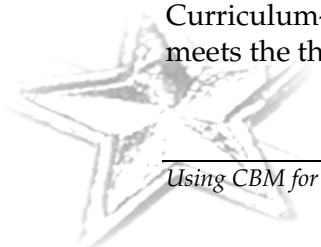
Traditional assessments used in schools are generally lengthy tests that are not administered on a regular basis. Many times, traditional assessments are administered to students once per year, and teachers do not receive their students' scores until weeks or months later, sometimes after the school year is complete. Because teachers do not receive immediate feedback, they cannot use these assessments to adapt their teaching methods or instructional programs in response to the needs of their students.

One type of progress monitoring, CBM, is an alternative to commercially prepared, traditional assessments that are administered at one point in time. CBM provides teachers with an easy and quick method of obtaining empirical information on the progress of their students. With frequently obtained student data, teachers can analyze student scores to adjust student goals and revise their instructional programs. That way, instruction can be tailored to best fit the needs of each student.

Another problem with traditional assessments is that student scores are based on national scores and averages. In fact, the students in a teacher's classroom may differ tremendously from a national sample of students. CBM allows teachers to compare an individual student's data to data on other students in their classroom. Schools or school districts may also collect normative data on the students within their own school or district to provide teachers with a local normative framework for interpreting scores.

What Is Curriculum-Based Assessment?

Curriculum-based assessment is a broader term than CBM. As defined by Tucker (1987), CBM meets the three curriculum-based assessment requirements:



a. Measurement materials are aligned with the school's curriculum;
b. Measurement is frequent; and
c. Assessment information is used to formulate instructional decisions.

CBM is just one type of curriculum-based assessment.

What Is the Difference Between Curriculum-Based Assessment and CBM?

CBM is a distinctive form of curriculum-based assessment because of two additional properties. First, each CBM test is an alternate form of equivalent difficulty. Each test samples the year-long curriculum in exactly the same way using prescriptive methods for constructing the tests. In fact, CBM is usually conducted with "generic" tests, designed to mirror popular curricula. By contrast, other forms of curriculum-based assessment (CBA) require teachers to design their own assessment procedures. The creation of those CBA tests can be time-consuming for teachers because the measurement procedures (a) change each time a student masters an objective and (b) can differ across pupils in the same classroom.

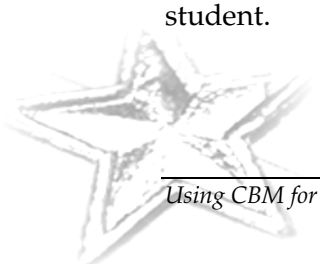
The second distinctive feature of CBM is that it is highly prescriptive and standardized. This guarantees reliable and valid scores. CBM provides teachers with a standardized set of materials that has been researched to produce meaningful and accurate information. By contrast, the adequacy of teacher-developed CBA tests and commercial CBA tests is largely unknown. It is uncertain whether scores on those CBA tests represent performance on meaningful, important skills and whether the student would achieve a similar score if the test were re-administered.

The Basics of CBM

CBM is used to monitor student progress across the entire school year. Students are given standardized math probes at regular intervals (weekly, bi-weekly, monthly) to produce accurate and meaningful results that teachers can use to quantify short- and long-term student gains toward end-of-year goals. With CBM, teachers establish long-term (i.e., end-of-year) goals indicating the level of proficiency students will demonstrate by the end of the school year.

CBM tests (also called "probes") are relatively brief and easy to administer. The probes are administered the same way every time. Each probe is a different test, but the probes assess the same skills at the same difficulty level. The math probes have been prepared by researchers or test developers to represent standard math curricula and to be of equivalent difficulty from probe to probe within each grade level.

Probes are scored, and student scores are graphed for teachers to consider when making decisions about the instructional programs and teaching methods for each student in the class. CBM provides a doable and technically strong approach for quantifying student progress. Using CBM, teachers determine quickly whether an educational intervention is helping a student.



What CBM Probes Are Available?

Currently, CBM probes are available in reading, math, written expression, and spelling. This manual focuses on Written Expression and Spelling CBM.

CBM Research

Research has demonstrated that when teachers use CBM to guide instructional decision making, students learn more, teacher decision making improves, and students are more aware of their own performance (e.g., Fuchs, Deno, & Mirkin, 1984). CBM research, conducted over the past 30 years, has also shown CBM to be reliable and valid (e.g., Deno, 1985; Germann & Tindal, 1985; Marston, 1988; Shinn, 1989).

The following is a bibliography of selected CBM articles. Appendix A contains a more extensive list CBM research articles.

Deno, S. L., Marston, D., & Mirkin, P. (1982). Valid measurement procedures for continuous evaluation of written expression. *Exceptional Children Special Education and Pediatrics: A New Relationship, 48*, 368–371.

Deno, S. L., Mirkin, P., & Marston, D. (1980). *Relationships among simple measures of written expression and performance on standardized achievement tests* (Vol. IRLD-RR-22). University of Minnesota, Institute for Research on Learning Disabilities.

Espin, C.A., de La Paz, S., Scierka, B. J., & Roelofs, L. (2005). The relationship between curriculum-based measures in writing and quality and completeness of expository writing for middle school students. *Journal of Special Education, 38,* 208–217.

Espin, C. A., Scierka, B. J., Skare, S., & Halverson, N. (1999). Criterion-related validity of curriculum-based measures in writing for secondary school students. *Reading and Writing Quarterly, 15,* 5–27.

Espin, C. A., Shin, J., Deno, S. L., Skare, S., Robinson, S., & Benner, B. (2000). Identifying indicators of written proficiency for middle school students. *Journal of Special Education, 34*, 140–153.

Fewster, S., & MacMillan, P. D. (2002). School-based evidence for the validity of curriculum-based measurement of reading and writing. *Remedial and Special Education, 23,* 149–156.

Fuchs, L. S., & Deno, S. L. (1994). Must instructionally useful performance assessment be based in the curriculum? *Exceptional Children, 61*, 15–24.

Fuchs, L. S., & Fuchs, D. (1996). Combining performance assessment and curriculum-based measurement to strengthen instructional planning. *Learning Disabilities Research and Practice, 11,* 183–192.

Fuchs, L. S., & Fuchs, D. (1998). Treatment validity: A unifying concept for reconceptualizing the identification of learning disabilities. *Learning Disabilities Research and Practice, 13*, 204–219.

Fuchs, L. S., & Fuchs, D. (2002). Curriculum-based measurement: Describing competence, enhancing outcomes, evaluating treatment effects, and identifying treatment nonresponders. *Peabody Journal of Education, 77,* 64–84.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (1994). Strengthening the connection between assessment and instructional planning with expert systems. *Exceptional Children, 61,* 138–146.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (2005). Using technology to facilitate and enhance curriculum-based measurement. In K. Higgins, R. Boone, & D. Edyburn (Eds.), *The Handbook of Special Education Technology Research and Practice* (pp. 663–681). Whitefish Bay, WI: Knowledge by Design, Inc.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Allinder, R. M. (1991). Effects of expert system advice within curriculum-based measurement on teacher planning and student achievement in spelling. *School Psychology Review, 20,* 49–66.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Allinder, R. M. (1991). The contribution of skills analysis to curriculum-based measurement in spelling. *Exceptional Children, 57,* 443–452.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Phillips, N. B., & Karns, K. (1995). General educators' specialized adaptation for students with learning disabilities. *Exceptional Children, 61,* 440–459.

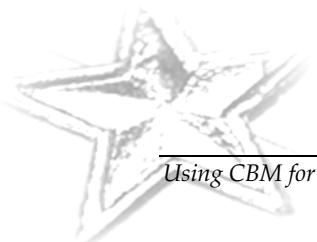
Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Stecker, P. M. (1991). Effects of curriculum-based measurement and consultation on teacher planning and student achievement in mathematics operations. *American Educational Research Journal, 28,* 617–641.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Walz, L., & Germann, G. (1993). Formative evaluation of academic progress: How much growth can we expect? *School Psychology Review, 22,* 27–48.

Fuchs, L. S., Fuchs, D., Karns, K., Hamlett, C. L., Dutka, S., & Katzaroff, M. (2000). The importance of providing background information on the structure and scoring of performance assessments. *Applied Measurement in Education, 13,* 83–121.

Fuchs, L. S., Fuchs, D., Karns, K., Hamlett, C. L., Katzaroff, M., & Dutka, S. (1997). Effects of task-focused goals on low-achieving students with and without learning disabilities. *American Educational Research Journal, 34,* 513–544.

Fuchs, L. S., Fuchs, D., Karns, K., Hamlett, C. L., & Katzaroff, M. (1999). Mathematics performance assessment in the classroom: Effects on teacher planning and student learning. *American Educational Research Journal, 36,* 609–646.



Gansle, K. A., Noell, G. H., VanDerHayden, A. M., Naquin, G. M., & Slider, N. J. (2002). Moving beyond total words written: The reliability, criterion validity, and time cost of alternative measures for curriculum-based measurement in writing. *School Psychology Review, 31,* 477–497.

Gansle, K. A., Noell, G. H., Vanderheyden, A. M., Slider, N. J., Hoffpauir, L. D., & Whitmarsh, E. L. (2004). An examination of the criterion validity and sensitivity to brief intervention of alternate curriculum-based measures of writing skill. *Psychology in the Schools, 41,* 291–300.

Gersten, R., & Dimino, J. A. (2001). The realities of translating research into classroom practice. *Learning Disabilities Research and Practice, 16,* 120–130.

Hosp, M. K., & Hosp, J. L. (2003) Curriculum-based measurement for reading, spelling, and math: How to do it and why. *Preventing School Failure, 48,* 10–17.

Jewell, J., & Malecki, C. K. (2005). The utility of CBM written language indices: An investigation of production-dependent, production-independent, and accurate-production scores. *School Psychology Review., 34*(1), 27–44.

Lembke, E., Deno, S. L., & Hall, K. (2003). Identifying an indicator of growth in early writing proficiency for elementary school students. *Assessment for Effective Intervention, 28*, 23–35.

Malecki, C. K., & Jewell, J. (2003). Developmental, gender, and practical considerations in scoring curriculum-based measurement writing probes. *Psychology in the Schools, 40,* 379–390.

Marston, D., & Deno, S. (1981). *The reliability of simple, direct measures of written expression* (Vol. IRLD-RR-50). U.S.; Minnesota.

Parker, R. I., Tindal, G., & Hasbrouck, J. (1991). Progress monitoring with objective measures of writing performance for students with mild disabilities. *Exceptional Children, 58*, 61–73.

Parker, R. I., Tindal, G., & Hasbrouck, J. (1991). Countable indices of writing quality: Their suitability for screening-eligibility decisions. *Exceptionality, 2*, 1–17.

Stecker, P. M., & Fuchs, L. S. (2000). Effecting superior achievement using curriculum-based measurement: The importance of individual progress monitoring. *Learning Disabilities Research and Practice, 15,* 128–134.

Tindal, G., & Hasbrouck, J. (1991). Analyzing student writing to develop instructional strategies. *Learning Disabilities Research and Practice, 6*, 237–245.

Tindal, G., & Parker, R. (1989). Assessment of written expression for students in compensatory and special education programs. *Journal of Special Education, 23*, 169–183.

Tindal, G., & Parker, R. (1991). Identifying measures for evaluating written expression. *Learning Disabilities Research and Practice, 6*, 211–218.

Videen, J., Deno, S. L., & Marston, D. (1982). *Correct word sequences: A valid indicator of proficiency in written expression* (Vol. IRLD-RR-84). University of Minnesota, Institute for Research on Learning Disabilities.

Watkinson, J. T., & Lee, S. W. (1992). Curriculum-based measures of written expression for learning-disabled and nondisabled students. *Psychology in the Schools, 29*, 184–192.

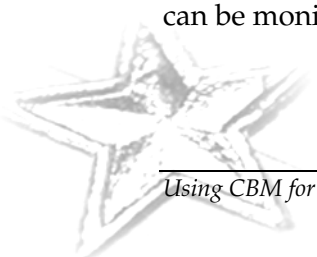
Weissenburger, J. W., & Espin, C. A. (2005). Curriculum-based measures of writing across grade levels. *Journal of School Psychology, 43*, 153–169.

Steps for Conducting CBM

Step 1: How to Place Students in a Written Expression or Spelling CBM Task for Progress Monitoring

The first decision for implementing CBM in Written Expression or Spelling is to decide which task or grade level of material is developmentally appropriate for each student to be monitored over the academic year. Choosing the appropriate CBM task depends upon the goals of the teacher.

If the goal is to monitor student spelling progress throughout the year, Spelling CBM should be used. If the goal is to monitor student writing fluency throughout the year, then Written Expression CBM should be used. Please note: Student progress in spelling *and* writing fluency can be monitored concurrently by implementing Spelling CBM *and* Written Expression CBM.



Step 2: How to Identify the Level of Material for Monitoring Progress

For Written Expression:

Written Expression CBM can be used in Grades 1 (as soon as students can write sentences) through 12.

The prompts for Written Expression CBM should be simple in sentence structure and should tap age-appropriate background knowledge of the students being monitored. The prompts should also represent the experiences of a wide range of school-age students. For example, English-language learners may not know about certain holidays, students in Florida may not relate to snow, and not all students relate to sports.

Also, the duration for student writing should be extended as students get older. Mid-elementary students should be given 3 minutes to write. Late-elementary students should be given 5 minutes to write, and middle- and high-school students should be given 7 minutes to write.

For Spelling:

Spelling CBM can be used in Grades 1–6.

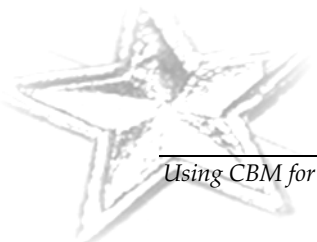
In a regular education classroom, the word lists for Spelling CBM should come from grade-level word lists. In special education classrooms, a grade-level Spelling CBM probe should be administered. If the student earns less than half of the total possible letter sequences, then a Spelling CBM probe from the next lower grade should be administered. This process of finding appropriate grade-level word lists should be repeated until a student gets at least half of the total possible letter sequences correct.

Once the appropriate grade level for Spelling CBM is determined, students should use the same grade-level word lists for the entire school year.

Step 3: How to Administer and Score Written Expression and Spelling CBM

With Written Expression CBM, students write sentences and paragraphs. With Spelling CBM, students spell words. After the CBM probes are administered, the teacher scores each probe and graphs the score on a student graph. The CBM score is a general overall indicator of the student's written expression or spelling competency.

A description of Written Expression and Spelling CBM follows.



Written Expression

Written Expression CBM consists of presenting students with a story starter and then allowing students to write for a set amount of time. Written expression CBM is administered to an entire class of students at one time. The teacher scores individual Written Expression CBM samples after administration is complete.

Before Written Expression CBM can be administered to students, story starters need to be written. A common theme should be used for the story starters, and story starters should always end mid-sentence. Once a set of story starters is developed for each Written Expression CBM administration, the story starter is written at the top of the student CBM copy or presented on the board or overhead.

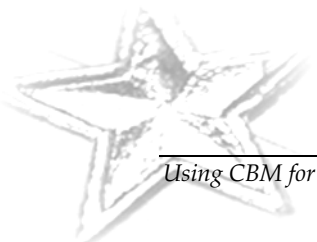
Here are a few sample story starters:

- I was on my way home from school and …
- I was talking to my friends when all of a sudden …
- It was a dark and stormy night …
- One day I found the most interesting thing …
- One night I had a strange dream about …
- The cave was dark and …
- I found a note under my pillow that said …
- One day I went to school but nobody was there except me …

Administration of Written Expression CBM is as follows. The story starter is presented orally to the class. This story starter is also written at the top of the page students will write on. Figure 1 presents a sample of a Written Expression CBM probe.

Figure 1. Sample Written Expression CBM Probe

One day my friend told me the strangest story _____



Students are given 30 seconds to think about their writing. The story starter is reread to the class. Students then write for 3 to 7 minutes. (The teacher chooses whether to allow students to write for 3, 5, or 7 minutes, but once the choice is made the amount of time must remain consistent throughout the entire school year.)

Figure 2 presents time recommendations for student writing.

Figure 2. Time Recommendations for Written Expression CBM

Grade Level	Time
Mid-elementary	3 minutes
Late-elementary	5 minutes
Middle school	7 minutes
High school	7 minutes

Scoring methods for Written Expression CBM

There are several ways to score Written Expression CBM. Teachers can use one scoring method or a combination of methods. Once scoring methods are chosen, they should remain consistent throughout the entire school year. Scoring by words written or total words spelled correctly provides basic information about student writing fluency, but it is recommended that teachers use CWS on CBM graphs for students in Grades 1–4 and CIWS for students in Grades 5–12.

Words written

The first method for scoring Written Expression CBM is to calculate the total number of words written. Correct spelling, word usage, capitalization, and punctuation are ignored when calculating the number of words written.

Look at this sample Written Expression CBM probe (Figure 3).

Figure 3. Written Expression CBM Scored by Words Written

The cave was very dark and I try to close my eyes, so I couldn't see anything, but that didn't help. Than I hear some one breathing. I try to stream, but nother came out. The breathing became close and close to me, and the worst Part was that I couldn't see athing. At first I thought meslef that I an Just emaging stuff.

The number of words written is 58. Note that words in the prompt (in bold) are not calculated as part of the total words written. The score for this Written Expression CBM is 58.

Score the Written Expression CBM problem in Figure 4 for the number of words written.

Figure 4. Written Expression CBM: Practice for Words Written

> **I was on my way home from school and** I saw my friend and we rund bilk to my hous. Bot she had to go to the bath room at the palk. So we played a little bit and we whant to the store and bot some goodes.

The total number of words written in Figure 4 is 39. A student's CBM score for total words written on Figure 4 would be 39.

Words spelled correctly

The second method for scoring Written Expression CBM is to calculate the number of words spelled correctly. Any correctly spelled English word is counted as correct. Proper usage, capitalization, and punctuation are ignored when calculating the number of words spelled correctly.

Let's look at the same Written Expression CBM sample. This time let's score it by calculating the number of words spelled correctly (Figure 5).

Figure 5. Written Expression CBM Scored by Words Spelled Correctly

> **The cave was very dark and** I try to close my eyes, so I couldn't see anything, but that didn't help. Than I hear some one breathing. I try to stream, but nother came out. The breathing became close and close to me, and the worst Part was that I couldn't see athing. At first I thought meslef that I an Just emaging stuff.

All of the words spelled incorrectly have been underlined. So, the number of words spelled correctly is 54. (58 total words written—4 words spelled incorrectly). The score for this Written Expression CBM is 54.

Score the Written Expression CBM probe in Figure 6 for the number of words spelled correctly.

Figure 6. Written Expression CBM: Practice for Words Spelled Correctly

> **One day we were playing outside the school and …** my friend, Jazzy, fell off the jungle gym. We thought that she would have been hurt but she wasn't really. All she got were a couple of sctraches on her knees and elbows, and some cuts. So she went inside to clean them up and get bandges. Ater she did that we started to play some more. We did a monkey bar contest and played tag. Soon we got bored, so me and Jazzy went to the back yard where all the trees are. We were going to climb our favorite tree.

There were 3 misspelled words in Figure 6 (sctraches, bandges, ater). The total number of words written was 92. 92 – 3 = 89. A student's score for number of words spelled correctly on Figure 6 would be 89.

Correct word sequences

The third method for scoring Written Expression CBM is to calculate the number of correct word sequences (CWS). Before scoring a sample using this method, the teacher must read the entire sample.

When scoring, a vertical line is placed where a sentence should end. (Judgment calls may have to be made about where a sentence should end.) All incorrect words are underlined. This includes words spelled incorrectly, words that are grammatically incorrect, and words that are used incorrectly.

A correct word sequence is one that contains any two adjacent, correctly spelled words that are acceptable within the context of the same to a native English speaker. The term "acceptable" means that a native speaker would judge the word sequences as syntactically and semantically correct. For sample, "the car" would be deemed acceptable, whereas "car eyebrow" would be deemed unacceptable.

A carat method is used during scoring. First, incorrect sequences are marked by putting a carat below the two words. Generally these are marked in red. Next, correct sequences are marked by putting a carat above tow words. Correct sequences are marked in blue.

When placing carats in a Written Expression CBM sample, correct carats are placed between any two non-underlined words, between a non-underlined word and line at the beginning of a sentence, and between a non-underlined word and the punctuation at the end of a sentence.

Here is a sample of carat marking within the sentence, "Joe went to the store."

^ Joe ^ went ^ to ^ the ^ store ^. (The CWS for this sentence is 6.)

Here is the first Written Expression CBM sample (Figure 7). It is marked to be scored for CWS.

Figure 7. Written Expression CBM Scored by CWS

The cave was very dark and ^ Iv tryvto^ close^ my^ eyes,^ so^ I^ couldn't^ see^ anything,^ but^ that^ didn't^ help^ .| vThanvI^ hearvsomevonev breathing^ .| ^ Ivtryvtovstreamv, butvnothervcame^ out^ .| ^ The^ breathingvbecamevclosevandv closevto^ me,^ and^ the^ worst^ Part^ was^ that^ I^ couldn't^ seevathingv.| ^ At^ first^ I^ thoughtv meselfvthat^ Iv anvJustv emagingv stuff^ .

The number of CWS in this Written Expression CBM sample is 36. The CBM score would be 36.

Correct minus incorrect word sequences

The fourth method for scoring Written Expression CBM is to calculate the number of incorrect word sequences and subtract that from the number of correct word sequences (CIWS).

For the sample above, the number of CWS is 36 and the number of incorrect word sequences is 27. 36 – 27 = 9. The CIWS for the written expression CBM sample is 9.

Let's practice. Score the following CBM probe using words written, words spelled correctly, CWS, and CIWS (Figure 8). (Figure 9 presents the probe scored.)

Figure 8. Written Expression CBM: Practice 1

One day, we were playing outside the school and … I Shrunk a Person olmost Steped on me But I Ran to fast ten Bjorn Nodest me. I seid Can You help me with Everthing he sied Yes! Ov course I sead Ya!

Figure 9. Written Expression CBM: Practice 1 Probe Scored

One day, we were playing outside the school and …^I ^Shrunkv | vavPersonvolmostv Stepedvon^me^But ^I^Ranvtovfastv | vtenvBjornvNodestvme^. | ^Ivseid vCan^You^help^ me^withvEverthingv | vhevsiedv Yes^! | vOvvcourse^Ivsead vYav!

The number of words written for this sample is 33.

The number of words spelled correctly is 22.

The CWS for this sample is 14.

The CIWS is 14 – 24 = –10

Let's look at another Written Expression CBM sample. Score the following probe using CWS and CIWS (Figure 10). (Figure 11 presents the probe scored.)

Figure 10. Written Expression CBM: Practice 2

It was a dark and stormy night … Phil was watchng a scary movie with his friends Bill and Pete. It was about a man-eating ghost nameed Fred who came to people on dark and stormy nights and ate them. Phil was really scared. he want to turn off the movie but didn't have to. All of a sudden the TV shut down. Then it turned on again and a clon was coming out of the TV he had a large nose and razor sharp teeth.

Figure 11. Written Expression CBM: Practice 2 Probe Scored

It was a dark and stormy night … ^Phil^was v<u>watchng</u>v^a^scary^movie^with^his^friends ^Bill^and^Pete^.|^It^was^about^a^man-^eating^ghostv<u>nameed</u>vFred^who^came ^to^people^on^dark^and^stormy^nights^and^ate^them^.|^Phil^was^really^scared^.| vhevwantv to^turn^off^the^movie^but^didn't^have^to^.|^All^of^a^sudden ^the^TV^shut^down^.|^Then^it^turned^on^again^and^av<u>clon</u>vwas^coming^out ^of^the^TVv|vhe^had^a^large^nose^and^razor^sharp^teeth^.

The CWS for this sample is 75.

The CIWS for this sample is 75 – 11 = 64.

Let's practice one more time. Score Figure 12 using all four scoring methods: words written, total words spelled correctly, CWS, and CIWS. (Figure 13 presents the probe scored.)

Figure 12. Written Expression CBM: Practice 3

I was watching TV when I heard a knock at the door and … I told him to go a way i'm watching TV Then he knack at the door agan so I went to see who it was it was a cute girl selling cookes and I ask how munch there are and she said I need about 3.50 Thats when it relised it was no girl selling cookes it was a 8 story tall locknes monster I said go away monster I ant got no 3.50 After all that I went to the lake to go fishing on my boate. When I was out on the water I had a big fish on my powls then it came up and then is said I need about 3.50 I said go away monster I work hard for my money

Figure 13. Written Expression CBM: Practice 3 Probe Scored

I was watching TV when I heard a knock at the door and … ^ ^ I ^ told ^ him ^ to ^ go v a v way v i'm v watching ^ TV v | ^ Then ^ he v knack v at ^ the ^ door v agan v so ^ ^ I ^ went ^ to ^ see ^ who ^ it ^ was v | v it ^ was ^ a ^ cute ^ girl ^ selling v cookes v and ^ I v ask v how v munch v there v are v and ^ she ^ said ^ I ^ need ^ about ^ 3.50 v | v Thats v when v it v relised v it ^ was ^ no ^ girl ^ selling v cookes v | v it ^ was v a v 8 ^ story ^ tall v locknes v monster v | ^ ^ I ^ said ^ go ^ away ^ monster ^ | ^ I v ant v got v no v 3.50 v | ^ After ^ all ^ that ^ ^ I ^ went ^ to ^ the ^ lake ^ to ^ go ^ fishing ^ on ^ my v boate v. | ^ When ^ ^ I ^ was ^ out ^ on ^ the ^ water ^ ^ I ^ had ^ a ^ big ^ fish ^ on ^ my v powls v | v then ^ it ^ came ^ up ^ and ^ then v is v said ^ ^ I ^ need ^ about ^ 3.50 v | ^ ^ I ^ said ^ go ^ away ^ monster ^ I ^ work ^ hard ^ for ^ my ^ money v

The number of words written is 126. The number of words spelled correctly is 118.

(126 – 8 = 118.) The CWS is 90. The CIWS is 43. (90 – 47 = 43.)

Spelling

Each Spelling CBM involves students spelling a list of words. Spelling CBM is administered to the entire group or individually. The teacher grades individual Spelling CBM samples after administration is complete.

Before Spelling CBM can be administered to students, random lists of words from an appropriate grade level need to be determined. Word lists can be selected from any source (from Zaner-Bloser word lists at the student's grade level, from Dolch word lists at the student's grade level, etc.). All words, however, should come from the same source and be from the same grade level from the universe of words taught in the spelling program at the student's level. Lists of randomly selected words from the master list, are generated for each spelling CBM administration.

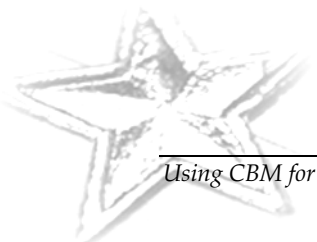
Administration of Spelling CBM is as follows. Each student has a lined piece of paper; the lines are consecutively numbered (Figure 14). The teacher says a word, uses it in a sentence, and then says the word again. (For example, "Number 1, cat. The cat has whiskers. Cat.") Students are given 10 seconds to write the word next to the correct number on their individual Spelling CBM probe. The teacher continues presenting words in the same manner for the entire spelling CBM list. Note that the teacher moves on to the next word after 10 seconds even if students are not finished spelling the previous word. Administration continues in this manner until students have had a cumulative total of 120 seconds, or 2 minutes, to respond. (This time limit does not include the time for administration of each word, only student response time in 10s increments.)

Figure 14. Sample CBM Spelling Probe

Spelling CBM

Name: _____ **Date:** _____

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



Scoring Method for Spelling CBM

To score Spelling CBM, the teacher counts the number of correct letter sequences (LS) within each word.

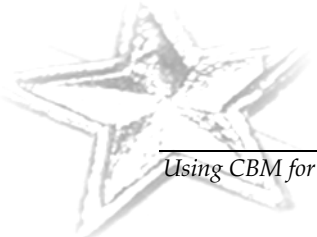
Similar to correct word sequences in Written Expression CBM, every pair of letters that appear together correctly is marked with a carat. If the first letter is correct, then a carat is placed before the first letter. If the last letter is correct, then a carat is placed after the last letter. Therefore, the maximum number of correct letter sequences is always the number of letters in the word plus 1. (For example, the maximum LS for "apple" is 6, and the maximum LS for "trouble" is 8.)

Let's look at the word "direct."

^D^I^R^E^C^T^	If spelled correctly, there are 7 correct letter sequences.
^D^I^R^E K T^	Spelled this way, there are 5 correct letter sequences.
^D R A K T^	Spelled this way, there are 2 correct letter sequences.

Look at these sample spellings. The total number of correct letter sequences is 36.

^c^o^l^e j e^	(college)	5 LS	^a^t^e^n s u n^	(attention)	5 LS
^t^e c^h e	(teach)	3 LS	^i^n^t^e^r s	(interest)	5 LS
^m^e e n^	(mean)	3 LS	^a^w^a^r t z	(awards)	4 LS
^w^o o d^	(would)	3 LS	^c^o^m^i^t y	(committee)	5 LS
r^e	(area)	1 LS	c e^n^s	(sense)	2 LS



Let's practice. Score the following Spelling CBM using LS (Figure 15). (Please note, on an actual Spelling CBM probe the words would not be written on the page. The words the student should spell are shaded.)

Figure 15. Spelling CBM: Practice 1

Word	Student Spelling	LS
said	s i a d	/5
word	w o r d	/5
other	u d r	/6
her	h e r	/4
look	l o o k	/5
should	s h u d	/7
find	f i n d	/5
did	d i d	/4
part	p o t	/5
little	l i t t i l e	/7
live	l i v e	/5
very	v e r y	/5
name	n a m e	/5
think	s h i c k	/6
through	f h o w	/8
mean	m e n	/5
tell	t e l	/5
want	w o t	/5
around	r a n d	/7

Here is Spelling CBM Practice 1 scored by correct letter sequences (Figure 16).

Figure 16. Spelling CBM: Practice 1 Probe Scored

Word	Student Spelling	LS
said	^s i a d^	2 /5
word	^w^o^r^d^	5 /5
other	u d r^	1 /6
her	^h^e^r^	4 /4
look	^l^o^o^k^	5 /5
should	^s^h u d^	3 /7
find	^f^i^n^d^	5 /5
did	^d^i^d^	4 /4
part	^p o t^	2 /5
little	^l^i^t^t i l^e^	6 /7
live	^l^i^v^e^	5 /5
very	^v^e^r^y^	5 /5
name	^n^a^m^e^	5 /5
think	s h^i c k^	2 /6
through	f h o w	0 /8
mean	^m^e n^	2 /5
tell	^t^e^l	3 /5
want	^w o t^	2 /5
around	r a n^d^	2 /7

The LS for the entire probe is 63.

Let's look at another Spelling CBM sample (Figure 17). Score the probe using LS.

Figure 17. Spelling CBM: Practice 2

Word	Student Spelling	LS
small	s m a l l	/6
airplane	a i r p l a c e	/9
duck	d u c k	/5
white	w h i t e	/6
color	c o r e	/6
barn	b r n e	/5
truck	t r u c k	/6
cold	c o u l d	/5
surprise	s p r i s e	/9
money	m u n e	/6
water	w e r t e r	/6
toy	t o y	/4
am	i m	/3
nothing	n u n t i n g	/8
fox	f o x	/4
tomorrow	t o o w m r o	/9
never	n e v e r	/6
farm	f o r m	/5
kitten	c i t i n	/7
took	t o o k	/5
please	p l e a s e	/7

Here is Spelling CBM Practice 2 scored by correct letter sequences (Figure 18).

Figure 18. Spelling CBM: Practice 2 Probe Scored

Word	Student Spelling	LS
small	^s^m^a^l^l^	6 /6
airplane	^a^i^r^p^l^a c e^	7 /9
duck	^d^u^c^k^	5 /5
white	^w^h^i^t^e^	6 /6
color	^c^o^ r e	3 /6
barn	^b r^n e	2 /5
truck	^t^r^u^c^k^	6 /6
cold	^c^o u l^d^	4 /5
surprise	^s p^r^i^s^e^	6 /9
money	^m u n^e	2 /6
water	^w e r t^e^r^	4 /6
toy	^t^o^y^	4 /4
am	i m^	l /3
nothing	^n u n t i^n^g^	4 /8
fox	^f^o^x^	4 /4
tomorrow	^t^o o w m r^o	3 /9
never	^n^e^v^e^r^	6 /6
farm	^f o r^m^	3 /5
kitten	c i^t i n^	2 /7
took	^t^o^o^k^	5 /5
please	^p^l^e^a^s^e^	7 /7

The LS for the entire sample is 90.

Step 4: How to Graph Scores

Once the CBM data for each student have been collected, it is time to begin graphing student scores. Graphing the score of each CBM on each student's graph is a vital aspect of the CBM program. These graphs give teachers a straightforward way of reviewing a student's progress, monitoring the appropriateness of the student's goals, judging the adequacy of the student's progress, and comparing and contrasting successful and unsuccessful instructional aspects of the student's program.

On Written Expression graphs, it is recommended that graphs for students in Grades 1–4 use CWS and graphs for students in Grades 5–12 use CIWS. On Spelling CBM graphs, all student graphs use correct LS.

CBM graphs help teachers make decisions about the short- and long-term progress of each student. Frequently, teachers underestimate the rate at which students can improve (especially in special education classrooms), and the CBM graphs help teachers set ambitious, but realistic, goals. Without graphs and decision rules for analyzing the graphs, teachers often stick with low goals. By using a CBM graph, teachers can use a set of standards to create more ambitious student goals and help better student achievement. Also, CBM graphs provide teachers with actual data to help them revise and improve a student's instructional program.

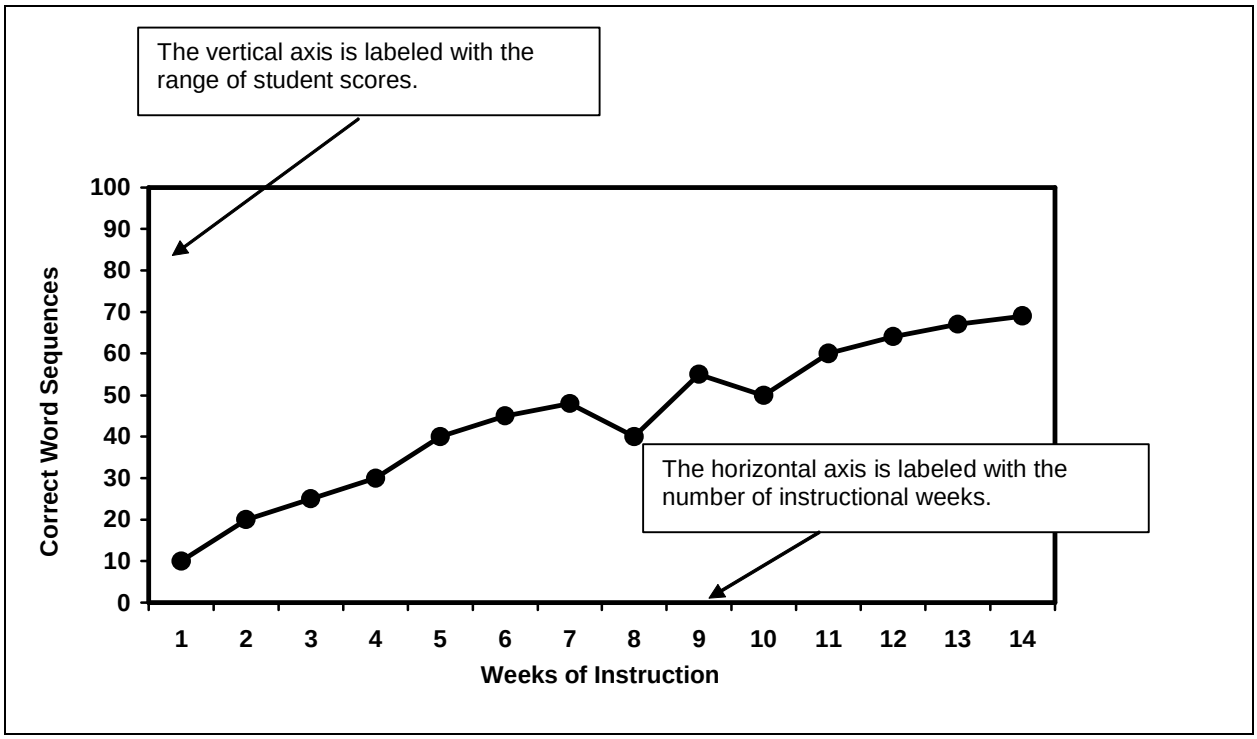
Teachers have two options for creating CBM graphs of the individual students in the classroom. The first option is that teachers can create their own student graphs using graph paper and pencil. The second option is to create graphs using computer software (such as Microsoft Excel).

Creating Your Own Student Graphs

It is easy to graph student CBM scores on teacher-made graphs. Teachers create a student graph for each individual CBM student so they can interpret the CBM scores of every student and see progress or lack thereof.

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 0 to the highest possible CBM score. On the horizontal axis, the number of weeks of instruction is listed (Figure 19). Once the teacher creates the master graph, it can be copied and used as a template for every student.

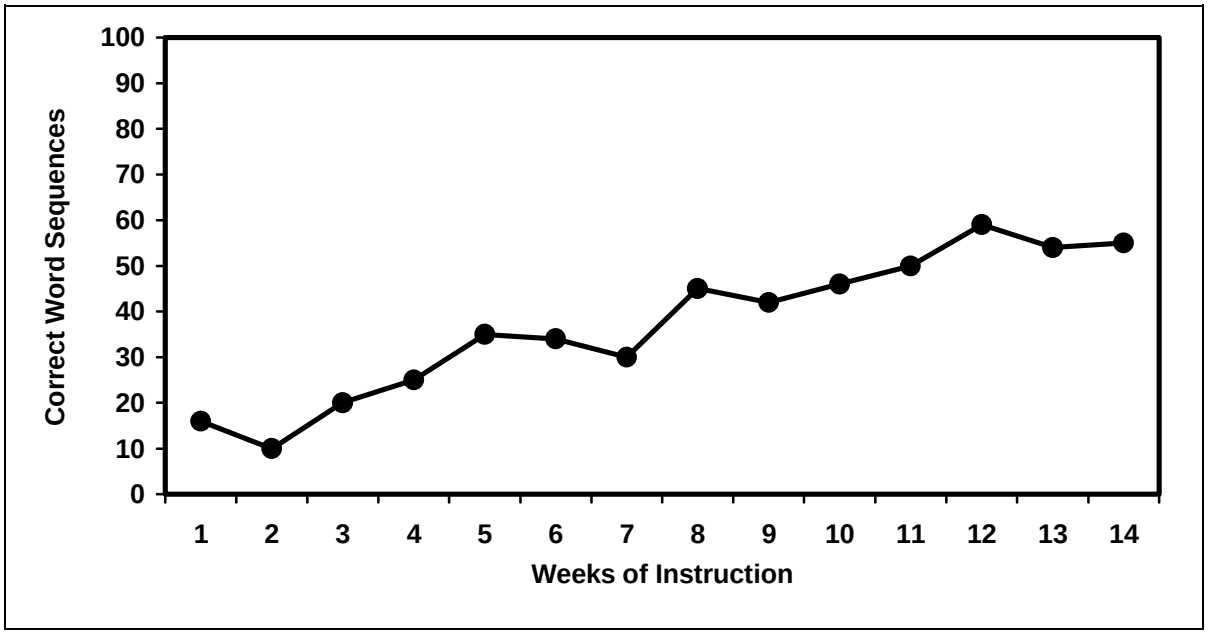
Figure 19. Labeling the CBM Graph



Beginning to Chart Data

Every time a CBM probe is administered, the teacher scores the probe and then records the score on a CBM graph (Figure 20). A line can be drawn connecting each data point.

Figure 20. Sample CBM Graph



Step 5: How to Set Ambitious Goals

Once a few CBM scores have been graphed, it is time for the teacher to decide on an end-of-year performance goal for the student. There are three options. Two options are utilized after at least three CBM scores have been graphed. One option is utilized after at least eight CBM scores have been graphed.

Option #1: 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. The benchmark, or end-of-year performance goal, 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.

See recommendations for Grades 1–6 in Figure 21. For Written Expression CBM, it is suggested that the teacher, school, or district create local norms (based on classroom, school, or district performance).

Figure 21. CBM Written Expression and Spelling Benchmarks

Grade	Benchmark
1st Written Expression	Use school or district norms
1st Spelling	60 LS or 12 words
2nd Written Expression	Use school or district norms
2nd Spelling	79 LS or 12 words
3rd Written Expression	Use school or district norms
3rd Spelling	80 LS or 12 words
4th Written Expression	Use school or district norms
4th Spelling	80 LS or 12 words
5th Written Expression	Use school or district norms
5th Spelling	85 LS or 12 words
6th Written Expression	Use school or district norms
6th Spelling	85 LS or 12 words

For example, the benchmark for a second-grade student in Spelling CBM is 79 correct LS. The end-of-year performance goal of 79 would be graphed on the student's graph. The goal-line would be drawn between the median of the first few CBM scores and the end-of-year performance goal.

Option #2: Intra-Individual Framework

Identify the weekly rate of improvement for the target student under baseline conditions, using at least eight CBM data points. Multiply this baseline rate 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 8 Written Expression CBM CWS scores were 26, 22, 26, 30, 32, 28, 27, and 24. To calculate the weekly rate of improvement, find the difference between the highest score and the lowest score. In this instance, 32 is the highest score and 22 is the lowest score: 32 – 22 = 10. Since 8 scores have been collected, divide the difference between the highest and lowest scores by the number of weeks: 10 ÷ 8 = 1.25.

1.25 is multiplied by 1.5: 1.25 × 1.5 = 1.875. Multiply the product of 1.875 by the number of weeks until the end of the year. If there are 14 weeks left until the end of the year: 0.9375 × 14 = 26.25. The average score of the first 8 data points was 26.75. The sum of 26.25 and the average score is the end-of-year performance goal: 26.75 + 26.25 = 53. The student's end-of-year performance goal for CWS would be 53.

Option #3: Norms

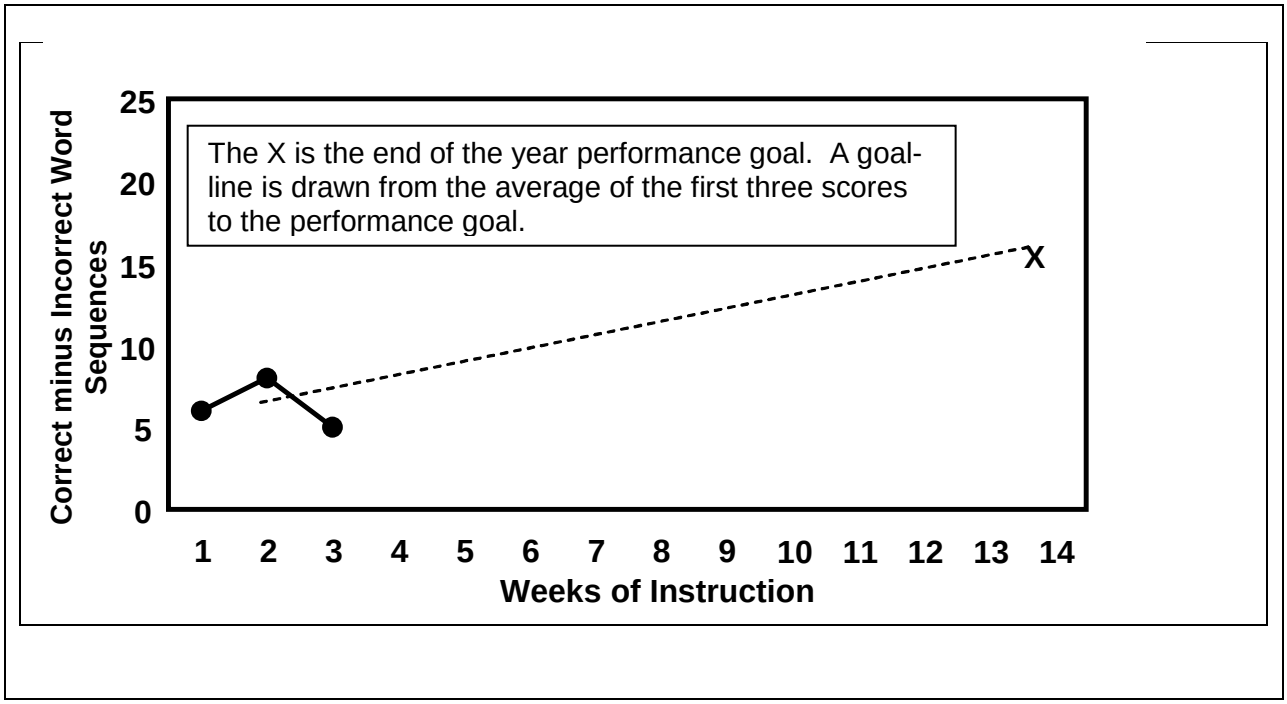
For typically developing students at the grade level where the student is being monitored, an average rate of weekly increase can be used to determine and end-of-year performance goal. In Written Expression CBM and Spelling CBM, slopes should be determined at the school or district level.

For example, let's say that a fourth-grade student's average score from his first three Spelling CBM Computation probes is 50. The norm slope for fourth-grade students is .80 based on district norms. The .80 is the weekly rate of growth for fourth graders. 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, then multiply 16 by .80: $16 \times .80 = 12.8$ Add 12.8 to the baseline average of 50 ($12.8 + 50 = 62.8$). This sum (62.8) is the end-of-year performance goal.

Drawing the Goal and the Goal-Line on the Graph

The teacher creates an end-of-year performance goal for the student using one of the three options. The performance goal is marked on the student graph at the year-end date with an "X." A "goal-line" is then drawn between the average of the initial graphed scores and the end-of-year performance goal (Figure 22). The goal-line shows the teacher and the students how quickly CBM scores should be increasing to reach the year-end goal.

Figure 22. Drawing a Goal-line



Monitoring the Appropriateness of the Goal

After deciding on an end-of-year performance goal and drawing the goal-line, teachers continually monitor the student graph to determine whether student progress is adequate. This tells the teacher whether the instructional program is effective. When at least 7 or 8 CBM scores have been graphed, teachers draw a trend-line to represent the student's actual progress. By drawing the trend-line, teachers can compare the goal-line (desired rate of progress) to the trend-line (actual rate of progress).

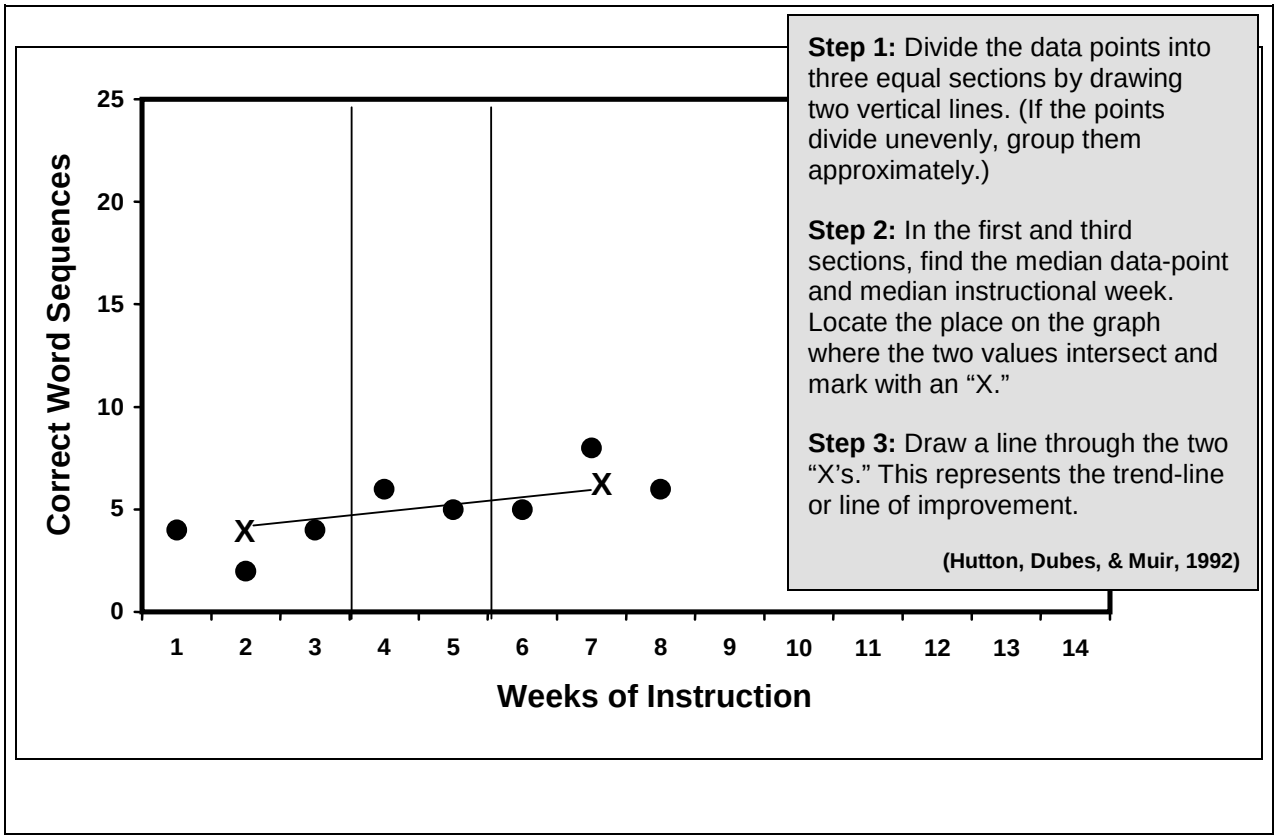
Drawing a Trend-Line Using the Tukey Method

To draw a trend-line, teachers use a procedure called the Tukey method. The Tukey method provides a fairly accurate idea of how the student is progressing.

Teachers use the Tukey method after at least 7 or 8 CBM scores have been graphed. First, the teacher counts the number of charted scores and divides the scores into 3 fairly equal groups. If the scores cannot be split into 3 groups equally, then try to make the groups as equal as possible.

Draw two vertical lines to divide the scores into 3 groups. Look at the first and third groups of data points. Find the median (middle) data point for each group and then median instructional week. Mark this point with an X. To draw the trend-line, draw a line through the two X's (Figure 23).

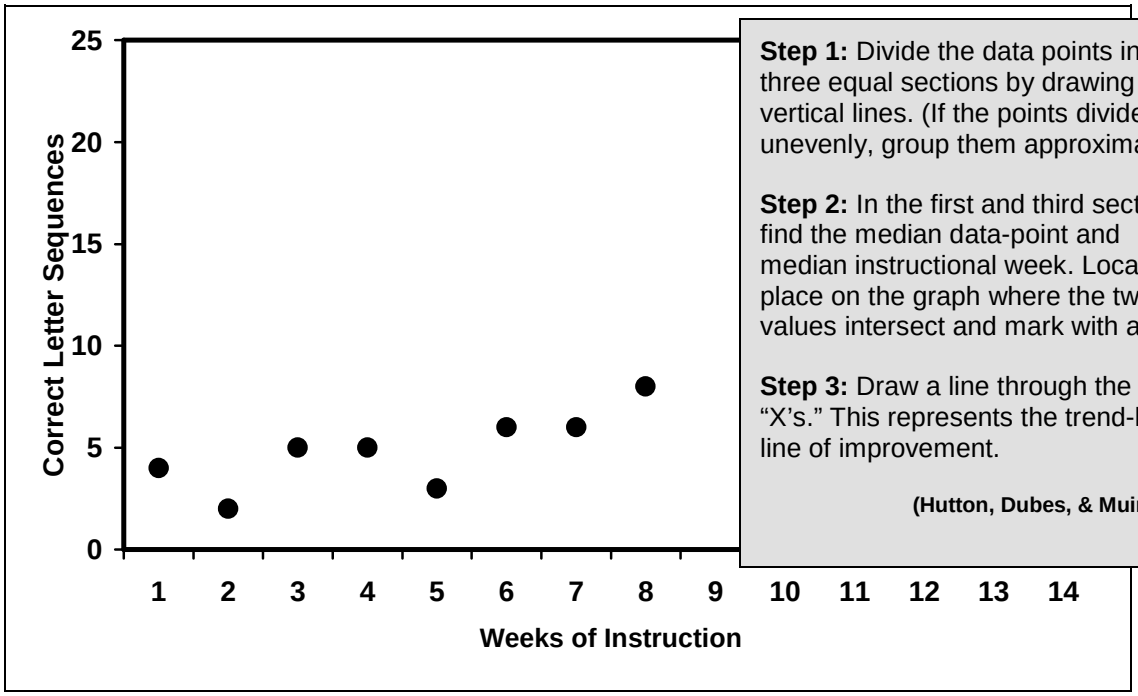
Figure 23. Drawing a Trend-line Using the Tukey Method



After the initial 7 or 8 data points are graphed and the Tukey method is used to create a trend-line, the student graphs should be re-evaluated using the Tukey method every 7 or 8 additional data points. Instructional decisions for students are based on the ongoing evaluation of student graphs.

Let's practice using the Tukey method. Draw a trend-line using the Tukey method (Figure 24).

Figure 24. Drawing a Trend-line Using the Tukey Method: Practice 1



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

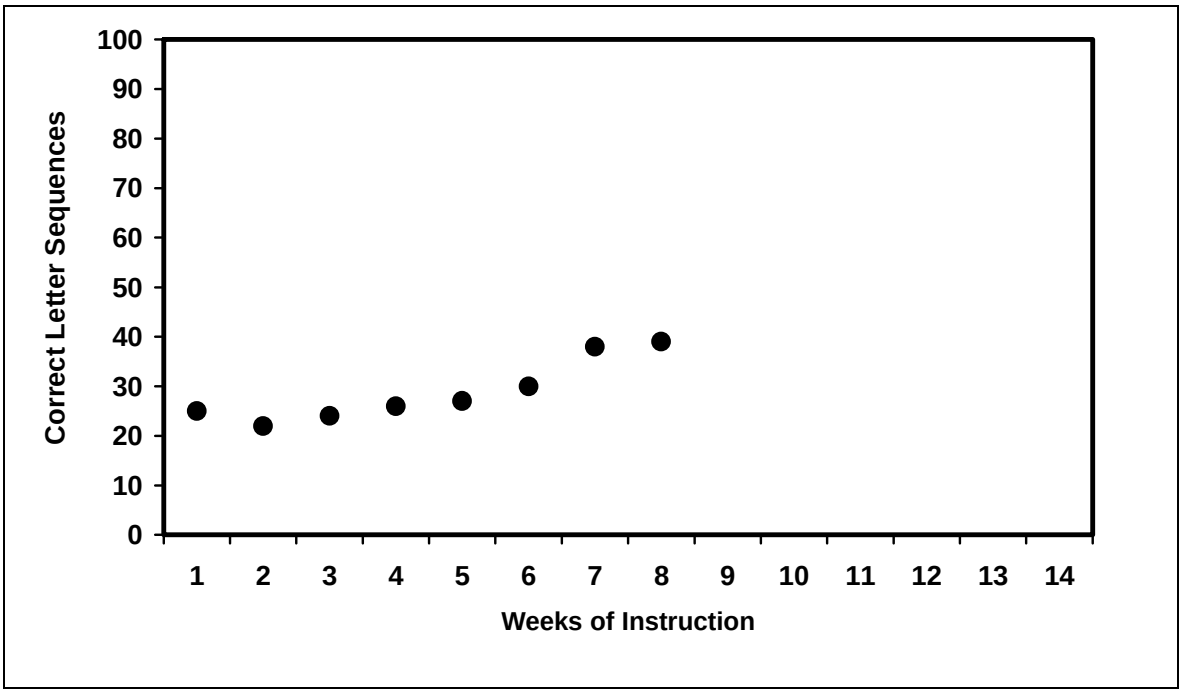
Step 2: In the first and third sections, find the median data-point and median instructional week. Locate the place on the graph where the two values intersect and mark with an "X."

Step 3: Draw a line through the two "X's." This represents the trend-line or line of improvement.

(Hutton, Dubes, & Muir, 1992)

Try this one (Figure 25).

Figure 25. Drawing a Trend-line Using the Tukey Method: Practice 2



Your graphs should look like Figures 26 and 27.

Figure 26. Drawing a Trend-line Using the Tukey Method: Practice 1

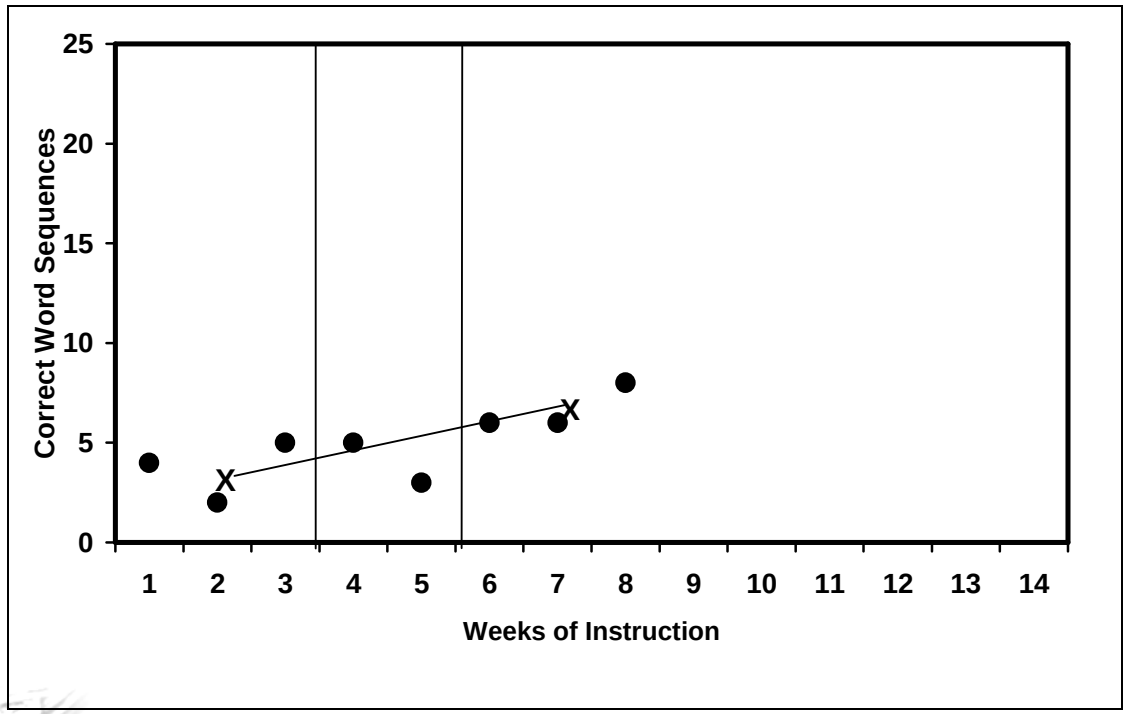
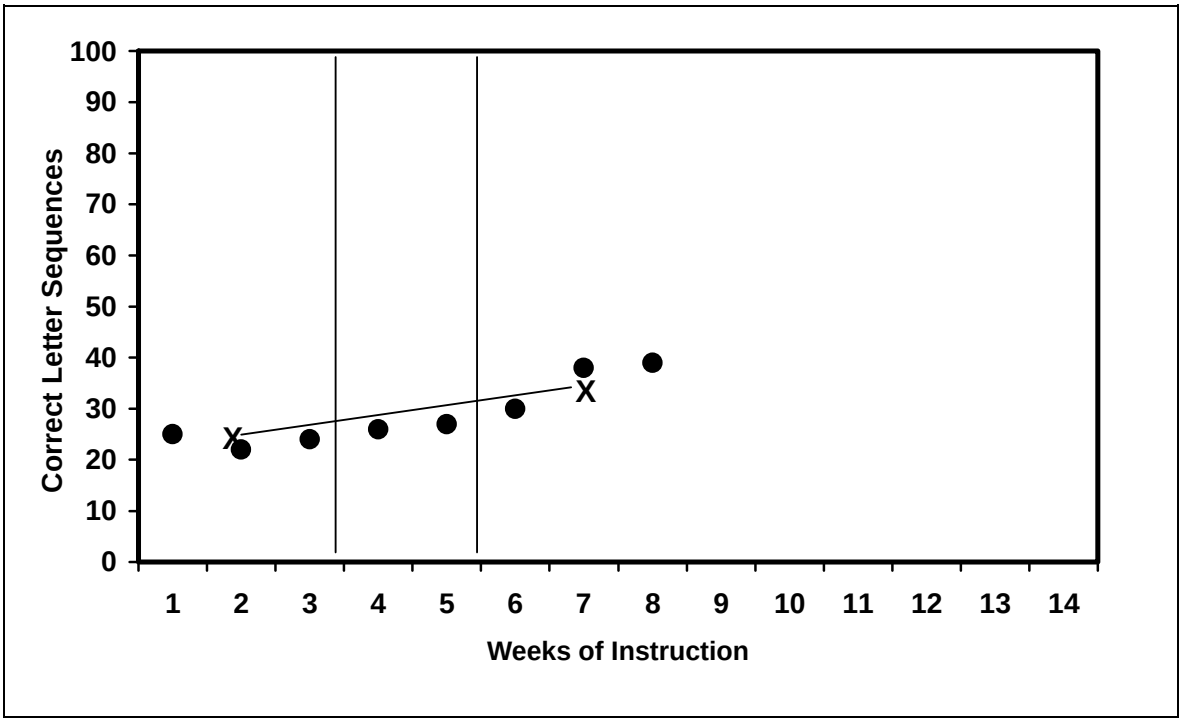


Figure 27. Drawing a Trend-line Using the Tukey Method: Practice 2



Step 6: How to Apply Decision Rules to Graphed Scores to Know When to Revise Programs and Increase Goals

CBM can judge the adequacy of student progress and the need to change instructional programs. Researchers have demonstrated that CBM can be used to improve the scope and usefulness of program evaluation decisions (Germann & Tindal, 1985) and to develop instructional plans that enhance student achievement (Fuchs, Deno, & Mirkin, 1984; Fuchs, Fuchs, & Hamlett, 1989a).

After teachers draw CBM graphs and trend-lines, they use graphs to evaluate student progress and to formulate instructional decisions. Standard CBM 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 4 consecutive scores:

- If the most recent 4 consecutive CBM scores are above the goal-line, the student's end-of-year performance goal needs to be increased.

- If the most recent 4 consecutive CBM scores are below the goal-line, the teacher needs to revise the instructional program.

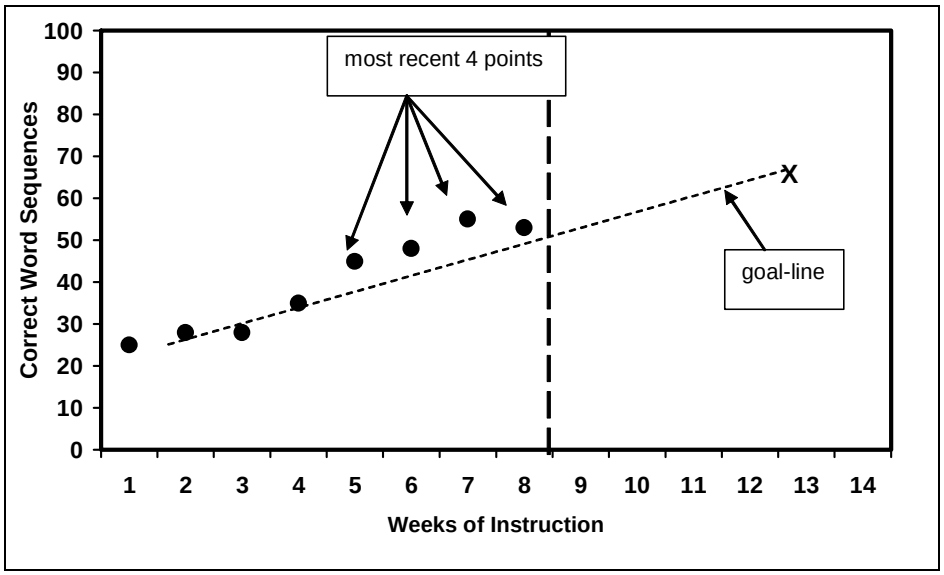
Decision rules based on the trend-line:

- 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.

Let's look at each of these decision rules and the graphs that help teachers make decisions about a student's writing or spelling goals and instructional programs.

Look at the graph in Figure 28.

Figure 28. Four Consecutive Scores Above Goal-Line

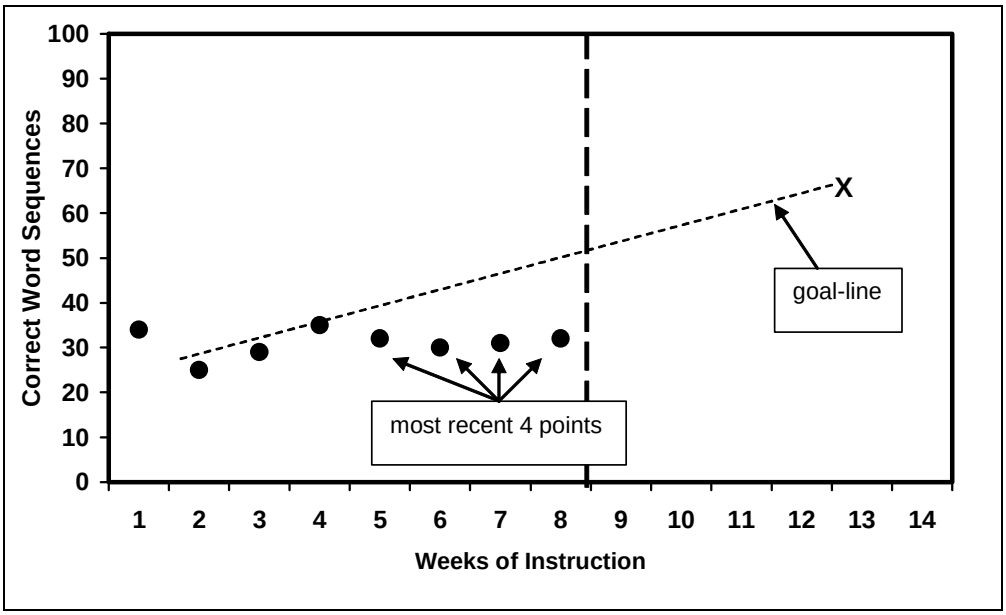


On this graph, the most recent 4 scores are above the goal-line. Therefore, the student's end-of-year performance goal needs to be adjusted. The teacher increases the desired rate (or goal) to boost the actual rate of student progress.

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 re-evaluates the student graph in another 7 or 8 data points to determine whether the student's new goal is appropriate or whether a teaching change is needed.

Look at the graph in Figure 29.

Figure 29. Four Consecutive Scores Below Goal-Line

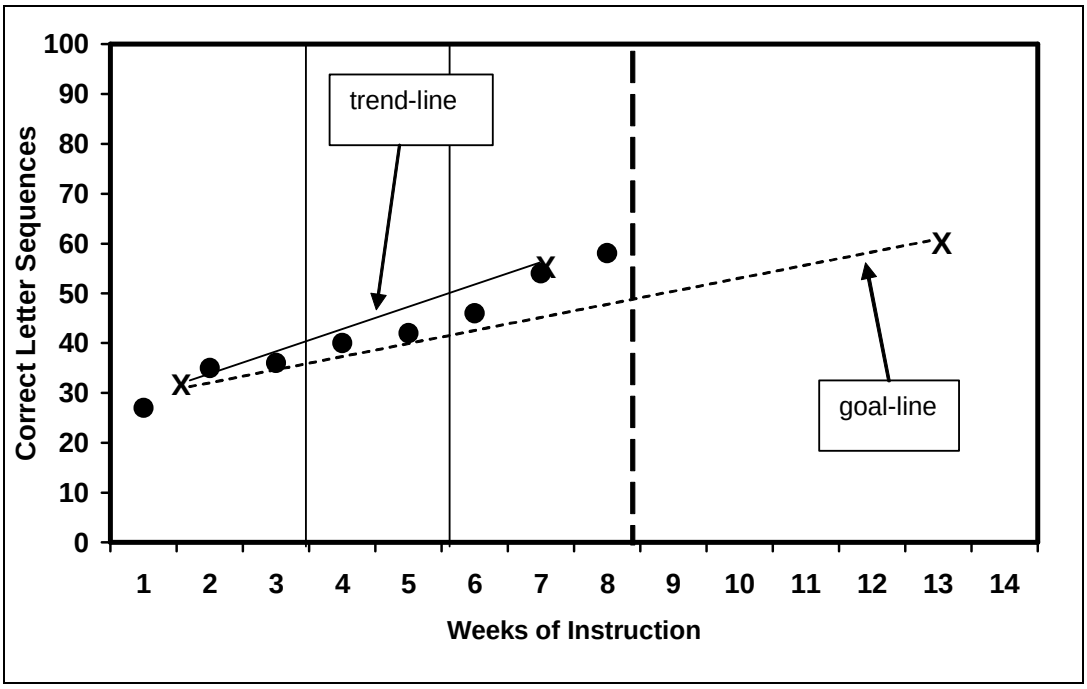


On this graph, the most recent 4 scores are below the goal-line. Therefore, the teacher needs to change the student's instructional program. The end-of-year performance-goal and goal-line never decrease; they can only increase. The instructional program should be tailored to bring a student's scores 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 re-evaluates the student graph in another 7 or 8 data points to determine whether the change was effective.

Look at the graph in Figure 30.

Figure 30. Trend-line Above Goal-Line

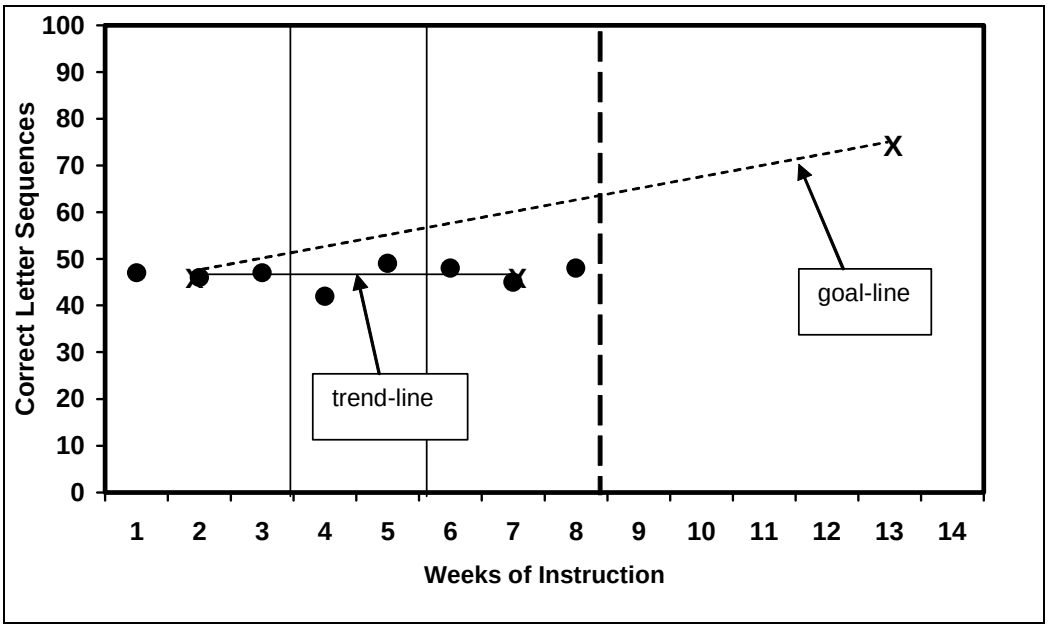


On this graph, the trend-line is steeper than the goal-line. Therefore, the student's end-of-year performance goal needs to be adjusted. The teacher increases the desired rate (or goal) to boost the actual rate of student progress. The new goal-line can be an extension of the trend-line.

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 re-evaluates the student graph in another 7 or 8 data points to determine whether the student's new goal is appropriate or whether a teaching change is needed.

Look at the graph in Figure 31.

Figure 31. Trend-line Below Goal-Line

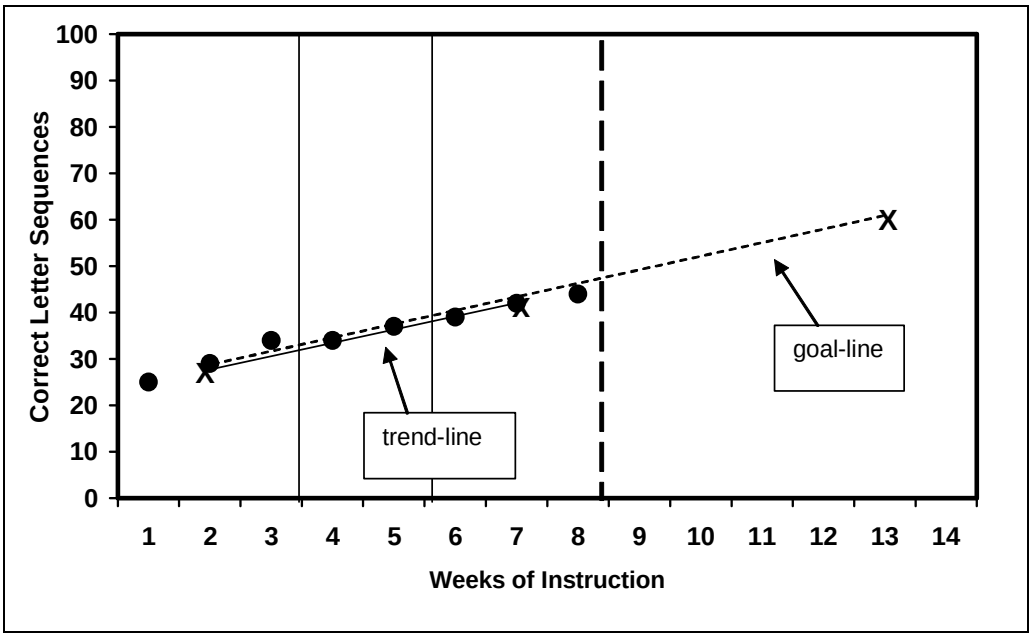


On this graph, the trend-line is flatter than the performance goal-line. The teacher needs to change the student's instructional program. Again, the end-of-year performance goal and goal-line are never decreased! A trend-line below the goal-line indicates that student progress is inadequate to reach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

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 re-evaluates the student graph in another 7 or 8 data points to determine whether the change was effective.

Look at the graph in Figure 32.

Figure 32. Trend-line Matches Goal-Line



If the trend-line matches the goal-line, then no change is currently needed for the student.

The teacher re-evaluates the student graph in another 7 or 8 data points to determine whether an end-of-year performance goal or instructional change needs to take place.

Step 7: How to Use the CBM Database Qualitatively to Describe Student Strengths and Weaknesses

In Written Expression CBM:

Teachers can use analytic or holistic ratings to complement the quantitative CBM data. Tindal and Hasbrouck (1991) provide three dimensions in which student writing can be qualitatively described. Student writing is scored on a five-point system in the areas of story idea, organization and cohesion, and conventions and mechanics.

Practice scoring the Written Expression CBM probes shown earlier in the manual using the 5 point system. Rate each probe based on story idea, organization and cohesion, and conventions and mechanics.

Figure 33 is an example of the Tindal and Hasbrouck (1991) scales. The scales are on page 239 of this article: Tindal, G., & Hasbrouck, J. (1991). Analyzing student writing to develop instructional strategies. *Learning Disabilities Research and Practice, 6*(4), 237–245.

Figure 33. Analytic Scales for Written Expression (Tindal & Hasbrouck, 1991)

Story-Idea	Organization-Cohesion	Conventions-Mechanics
5 -includes characters -delineates a plot -contains original ideas -contains some detail -word choice -contains descriptors (adverbs and adjectives) and colorful, infrequently used, and/or some long words	5 -overall story is organized into a beginning, middle, and an end -events are linked and cohesive -sentences are linked, often containing some transitions to help with organization (finally, then, next, etc.)	5 -sentence structure generally is accurate -spelling does not hinder readability -sometimes contains dialogue -handwriting is legible -punctuation does not effect readability too much -word usage generally is correct (s,v,o/homophone /s-v agreement)
4 -includes characters, but they are not original, often coming from movies -delineates a plot, although it is not as clear as 5 -contains some original ideas but is it fairly predictable -contains some detail -includes descriptors (adverbs and adjectives) -words choice: contains some descriptors (adverbs and adjectives) and some colorful, infrequently used, and/or long words	4 -story has somewhat of a beginning, middle, and an end -events appear somewhat random, but some organization exists -sample may contain some transitions to help with organization (finally, then, next, etc.) -story often contains too many events, disrupting cohesion	4 -sentence structure generally is accurate but not as good as 5 -spelling does not hinder readability too much -sometimes contains dialogue -handwriting is legible -punctuation does not effect readability too much -word usage generally is correct (s,v,o/homophone/s-v agreement)

Story-Idea	Organization-Cohesion	Conventions-Mechanics
3 -characters are predictable and undeveloped -plot is somewhat haphazard -may or may not contain original ideas -lacks detail -word choice is somewhat predictable only sometimes contains descriptors (adverbs and adjectives)	3 -somewhat of a plot exists but story may still lack a beginning, middle, or an end -events are somewhat random -often lacks transitions -sometimes lacks referents	3 -sentence structure has a few problems -spelling is somewhat of a problem -may use dialogue but does not punctuate it correctly -handwriting is legible -punctuation is fair -problems sometimes occur with word usage (s,v,o/homophone/ s-v agreement)
2 -includes few if any characters -plot is not developed or apparent -contains virtually no original ideas -detail is significantly absent -events are very predictable -word choice is predictable, lacking descriptors (adverbs and adjectives)	2 -plot lacks organization into a beginning, middle and an end -events are random, lacking in cohesion -lacks transitions -often lacks referents	2 -sentence structure makes story difficult to read -spelling makes it difficult to read -may use dialogue but does not punctuate it correctly -handwriting is not very legible -punctuation is inconsistent and problematic -word usage is problematic (s,v,o/homophone/s-v agreement)
1 -includes few if any characters -plot is non-existent -contains no original ideas -detail is significantly absent -events are few and predictable -lacks descriptors (adverbs and adjectives)	1 -plot is virtually nonexistent -events are few and random -lacks transitions -lacks referents	1 -sentence structure is problematic -spelling makes it extremely difficult to read -handwriting is illegible, making it extremely difficult to decode -punctuation is virtually nonexistent -word usage is problematic

In Spelling CBM:

Teachers can analyze student spelling to detect error patterns or areas for instruction.

Simple consonants and vowels:

- Does the student consistently identify consonants at the beginning and end of words?
- Does the student consistently recognize and write short vowel sounds?
- Does the student write vowels that are followed by the letter r, for example, "farm" rather than "frm" and "her" rather than "hr"?

Pairs of consonants:

- Does the student recognize and write both of the sounded consonants in words like "fast" and "hold"?
- Does the student correctly spell words with blends such as "grate" and "black"?
- Does student recognize and write consonant digraphs in words such as "teach" and "show"?
- Does the student correctly write double letters in two-syllable words with short vowels (such as "rabbit" and "happy")

Silent letters:

- Does the student write silent letters correctly, in such words as "know" and "climb"?

Long vowels:

- Does the student correctly write long vowel sounds in a variety of ways, such as words with a final e (such as "late"), with vowel teams (such as "read" and "main"), with –igh, –il, –ol (such as "night", "wild" and "cold"), with a –y (such as "party")?

Multisyllabic words, including words with suffixes:

- Does the student include a vowel in each syllable of multisyllabic words?
- Does the student follow rules for adding suffixes to root words (for example, "beautyful" rather than "beautiful")?

Second Half of CBM Manual

The rest of this CBM manual provides teachers with the following information.

How to Use the CBM Database to Accomplish Teacher and School Accountability and for Formulating Policy Directed at Improving Student Outcomes

Federal law requires schools to show that they are achieving Adequate Yearly Progress (AYP) toward the "No Child Left Behind" proficiency goal. AYP is the annual minimum growth rate needed to eliminate the discrepancy between a school's initial proficiency status and universal proficiency within the established time frame.

Schools must determine the measure(s) to be used for AYP evaluation and the criterion for deeming an individual student "proficient" on this measure. Schools must quantify AYP for achieving the goal of universal proficiency by the school year 2013–2014. CBM can be used to fulfill the AYP evaluation in written expression and/or spelling.

Schools can assess every student using CBM to identify the number of students who initially meet benchmarks. This number of students represents a school's initial proficiency status. Then the discrepancy between initial proficiency and universal proficiency can be calculated. Once the discrepancy between initial and universal proficiency is calculated, the discrepancy is divided by the number of years available before meeting the 2013–2014 goal. The resulting answer gives the number of additional students who must meet CBM end-of-year benchmarks each year.

Relying on CBM for specifying AYP provides several advantages. First, the CBM measures are simple to administer and examiners can be trained to administer the tests in a reliable fashion in a short amount of time. Second, because the tests are brief, schools can measure an entire

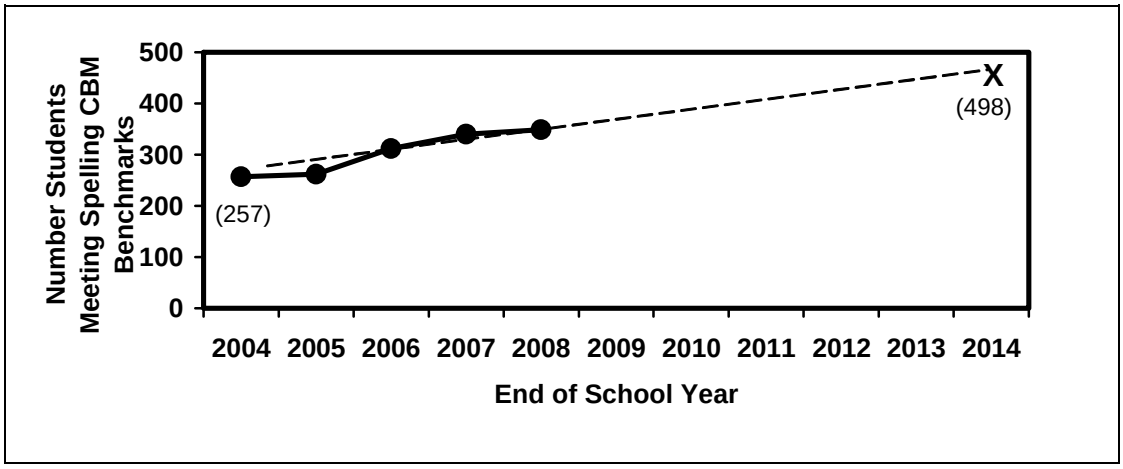
student body relatively efficiently and frequently. Routine testing allows a school to track its own progress over the school year. Progress can be examined at the school, teacher, or student level.

Using CBM for multi-level monitoring can transform AYP from a procedural compliance burden into a useful tool for guiding education reform at the school level, for guiding the instructional decision making of individual teachers about their written expression or spelling programs, and for ensuring that the written expression and spelling progress of individual students is maximized.

CBM provides a multi-level monitoring system that helps schools ensure greater levels of written expression and/or spelling success. Here are a few examples of how CBM can be used in conjunction with a school's AYP.

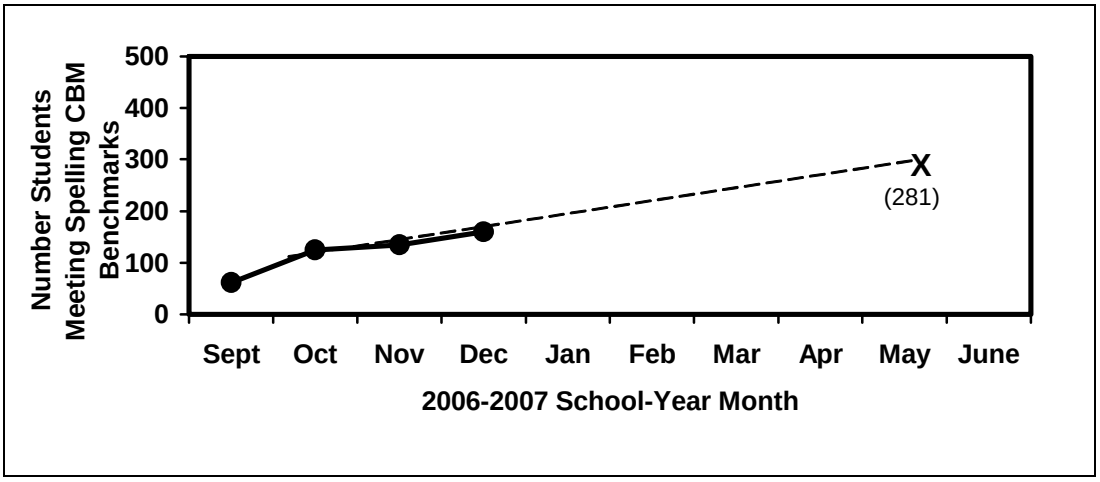
CBM can be used to monitor across-year progress in achieving AYP (and toward achieving universal proficiency by the 2013–2014 deadline) (Figure 34).

Figure 34. Across-Year School Progress



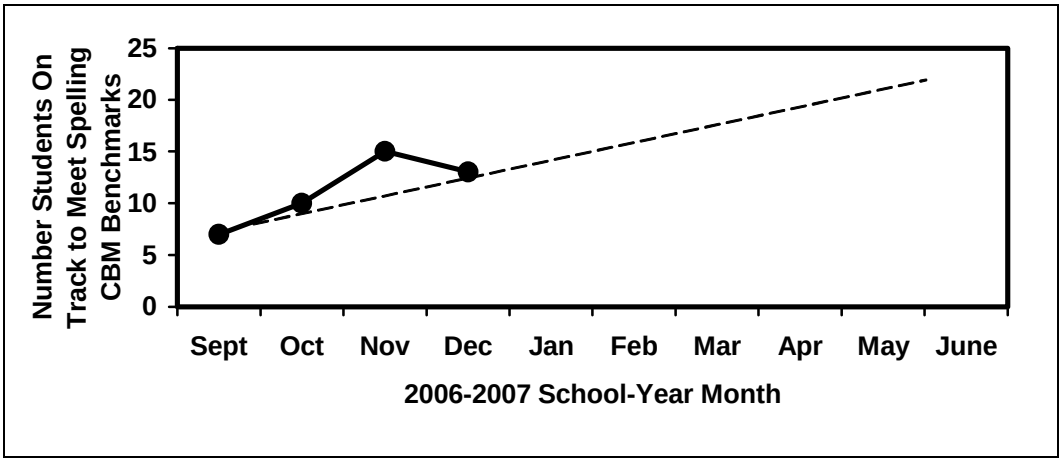
CBM can be used to monitor a school's within-year progress towards achieving the AYP for the year (Figure 35).

Figure 35. Within-Year School Progress



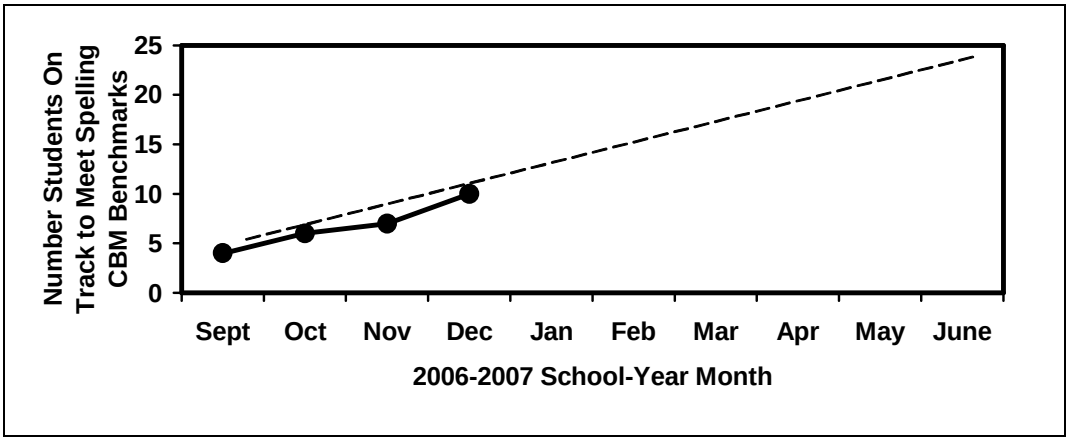
CBM can be used to monitor a teacher's within-year progress (Figure 36).

Figure 36. Within-Year Teacher Progress



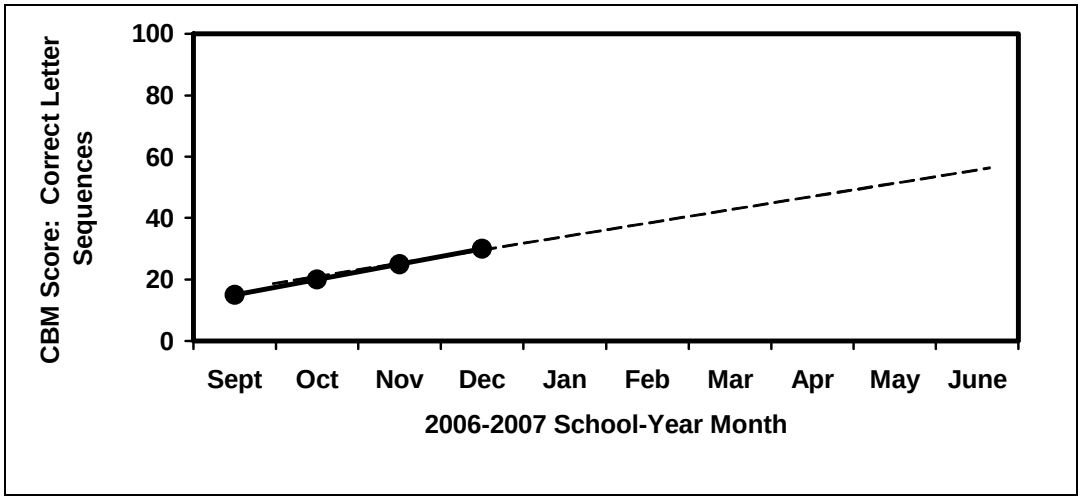
CBM can be used to monitor a school's special education performance within a school year (Figure 37).

Figure 37. Within-Year Special Education Progress



CBM can be used to monitor a student's within-year progress (Figure 38).

Figure 38. Within-Year Student Progress



For more information on using CBM for school accountability and AYP, see:

Fuchs, L.S. & Fuchs, D. (2004). Determining Adequate Yearly Progress from Kindergarten through Grade 6 with Curriculum-Based Measurement. *Assessment for Effective Instruction, 29,* 25–38.

How to Incorporate Decision-Making Frameworks to Enhance General Educator Planning

A CBM report like the one shown in Figure 34 provides the teacher with a framework to assist in instructional planning (Figure 39).

Figure 39. Spelling Instruction Plan Sheet

Instruction Plan Sheet

Teacher: Ms. Rannells

Student: Gunnar Watkins

Academic Area: Spelling

Date	Instructional Procedures			Arrangement		Time		Materials		Motivational Strategies
	Focus or Skill	Time Line	Teaching Strategies	Who	Ratio	Days per Week	Minutes	Level	Description	
11/2	a. sight word spelling	11/2 to end of school year	drill and practice: write words 10 times each	student	independent	3	5	2	sets of 10 words from spelling text - Level B	80% or better on Friday's test = 30 min free time
	b. sight word spelling	11/2 to end of school year	application: use words in sentences	student	independent	3	5	2		
	c. sight word spelling	11/2 to end of school year	drill and practice: spell each word from memory 3 times	student	independent	3	5	2		
1/10	vowel + r	1/10 to 2/15	a. introduce rule	student	individually	5	5	2	word lists first across then within categories	points during peer activities totaled for free time
	final e	1/10 to 2/15	b. guide sheet Work Sheet for practice in applying rule	student	individually	5	5			
			c. game practice	peer	1:1	5	5			
			d. drill practice - dictated word (test-like condition)	peer	1:1	5	5			

How to Use Progress Monitoring to Identify Non-Responders Within a Responsiveness-to-Intervention Framework to Identify Disability

The Individuals with Disabilities Education and Improvement Act (P.L. 108-446; IDEA 2004) cited two methods for identification of students with learning disabilities (LD). 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.

The traditional assessment framework (method 1) for identifying students with learning disabilities relies on discrepancies between intelligence and achievement tests. This framework has been scrutinized and attacked due to measurement and conceptual differences.

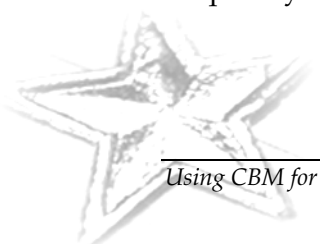
An alternative framework (method 2) is one in which learning disability is conceptualized as non-responsiveness to otherwise effective instruction. It requires that special education be considered only when a student's performance reveals a dual discrepancy: The student not only performs below the level demonstrated by classroom peers but also demonstrates a learning rate substantially below that of classmates.

Educational outcomes differ across a population of learners, and a low-performing student may ultimately perform not as well as his or her peers. All students do not achieve the same degree of written expression or spelling competence. Just because 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, then 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 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.

Basics of RTI

RTI uses response to intervention, at various tiers, to identify students with LD. 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. 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 IEP goals are established, individualized student programs are developed, and student progress is monitored to determine effectiveness of instructional programs and/or decide when a student may move back into secondary or primary prevention.

CBM is a promising tool for identifying treatment responsiveness due to its capacity to model student growth, to evaluate treatment effects, and to simultaneously inform instructional programming.

For more information on using CBM within a response-to-intervention approach to learning disability identification, see the Responsiveness-to-Intervention manual or presentation prepared for the 2006 National Center on Student Progress Monitoring Summer Institute.

CBM Case Study #1: Black Lake Elementary

Dr. Adams is the principal of Black Lake Elementary School. She has decided, along with the school teachers and district administration, to use CBM to monitor progress towards reaching Adequate Yearly Progress (AYP) towards their school's "No Child Left Behind" proficiency goal.

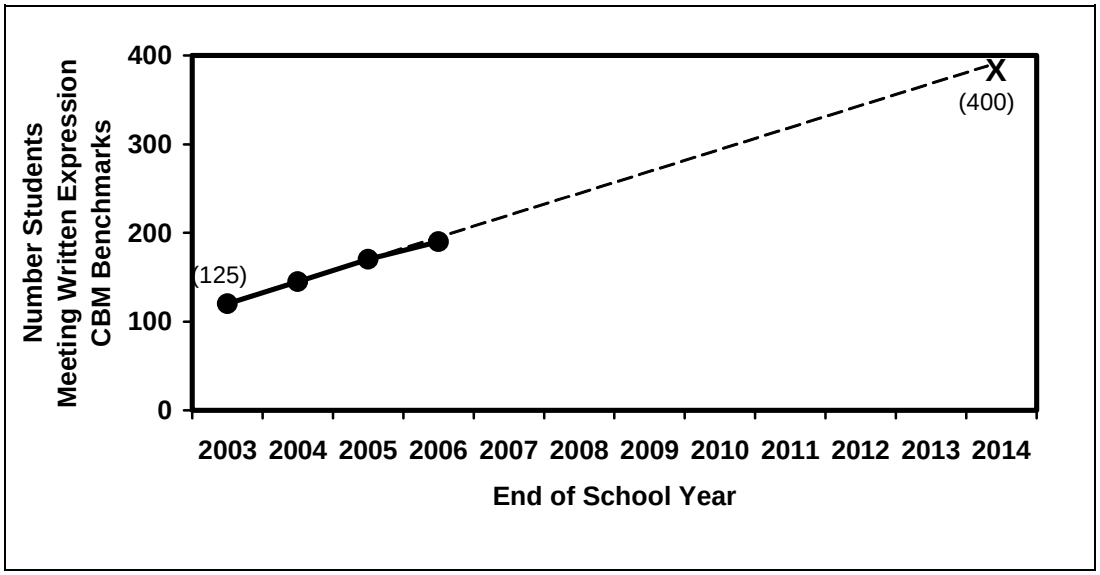
During school year 2002–2003, all 400 students at the school were assessed using Written Expression CBM at the appropriate grade level. 120 students initially met CBM benchmarks, and so 120 represents Black Lake's initial proficiency status. During the 2003–2004, 2004–2005, and 2005–2006 school years, the number of students meeting benchmarks rose from 120 to 145, 170, and 190. The discrepancy between 2005–2006 proficiency and universal proficiency is 210 students. (400 – 190 = 210).

To find the number of students who must meet CBM benchmarks each year before the 2013–2014 deadline, the discrepancy of 210 students is divided by the number of years until the deadline (8). 210 ÷ 8 = 26.25. Approximately, 26 students need to meet CBM benchmarks each year in order for the school to demonstrate AYP.

During the 2006–2007 school year, Dr. Adams is provided with these CBM graphs based on the performance of the students in her school.

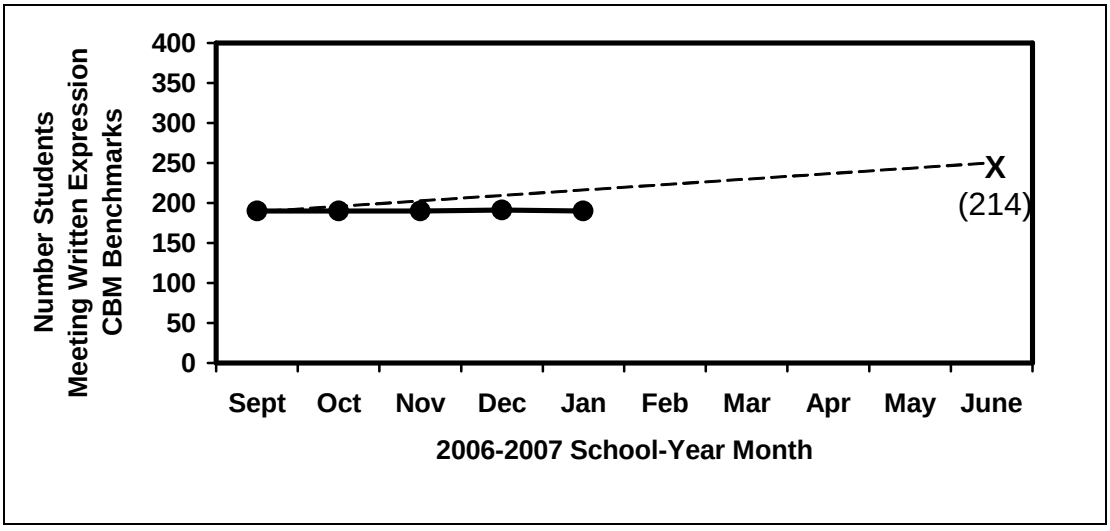
Based on this graph (Figure 40), what can Dr. Adams decide about her school's progress since the initial year of benchmarks?

Figure 40. Black Lake Elementary: Across-Year School Progress



Based on this graph (Figure 41), what can Dr. Adams decide about her school's progress since the beginning of the school year?

Figure 41. Black Lake Elementary: Within-Year School Progress



Dr. Adams receives the next two graphs from two different first-grade teachers (Figures 42 and 43). What information can she gather from these graphs?

Figure 42. Black Lake Elementary: Mrs. Ansari

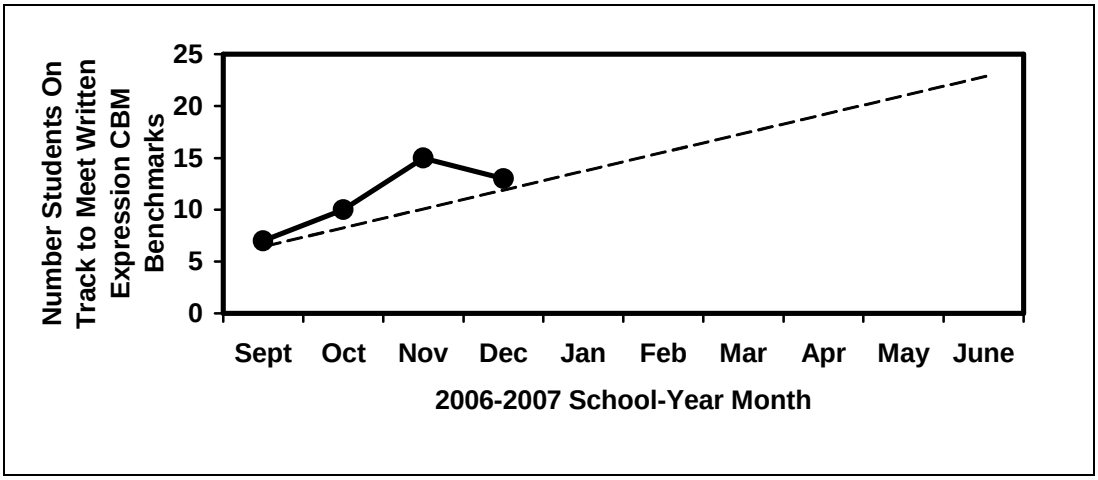
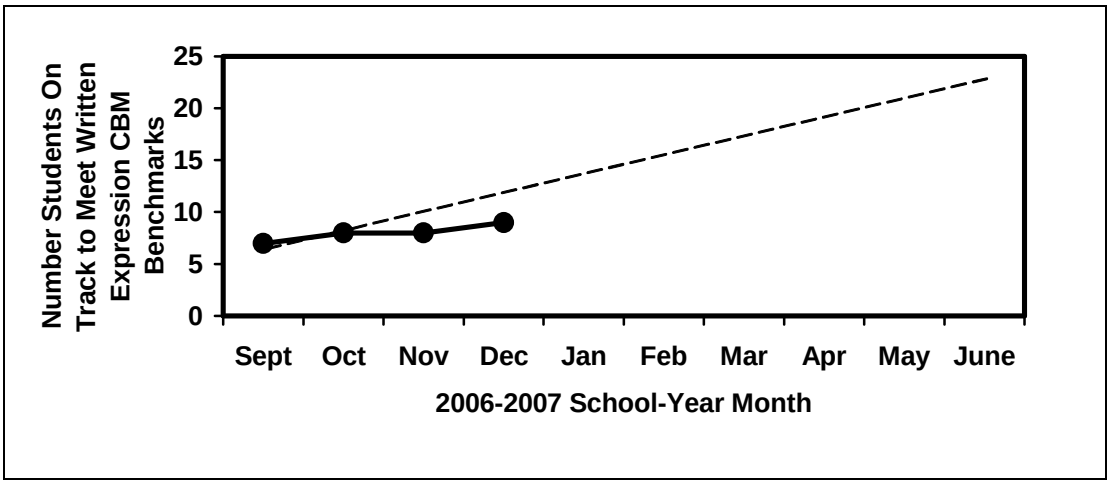
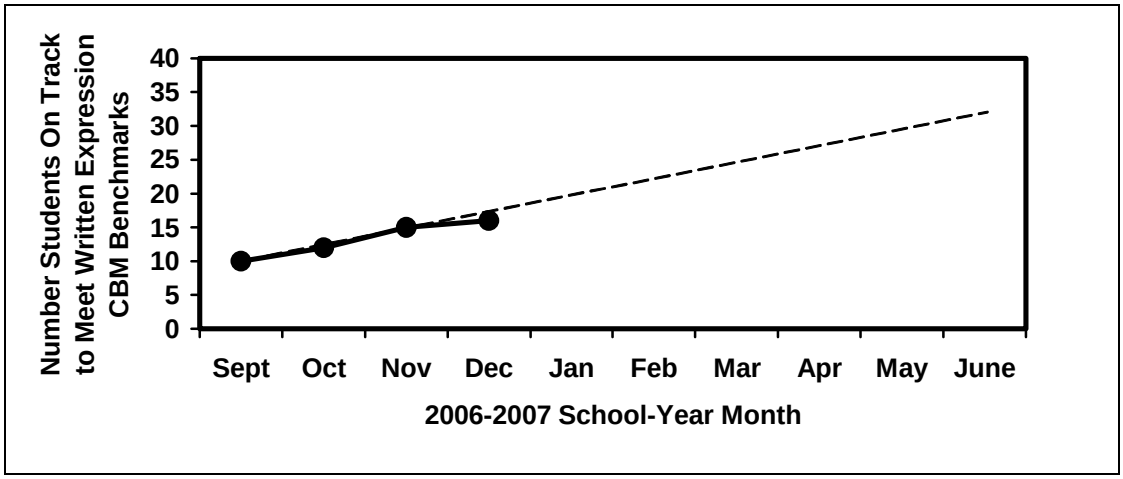


Figure 43. Black Lake Elementary: Mr. Bloom



This is the graph that Dr. Adams receives based on the performance of Black Lake's Special Education students (Figure 44). What should she learn from this graph?

Figure 44. Black Lake Elementary: Within-Year Special Education Progress



Dr. Adams receives a graph for every student in the school. She gives these graphs to the respective teachers of each student (Figures 45 and 46). How can the teachers use the graphs?

Figure 45. Ashton Summerfield

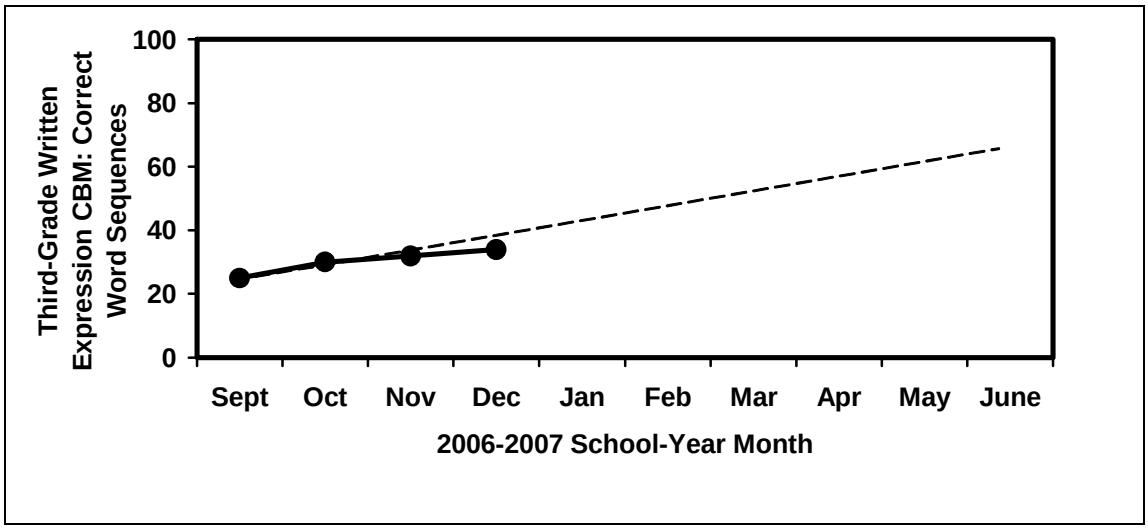
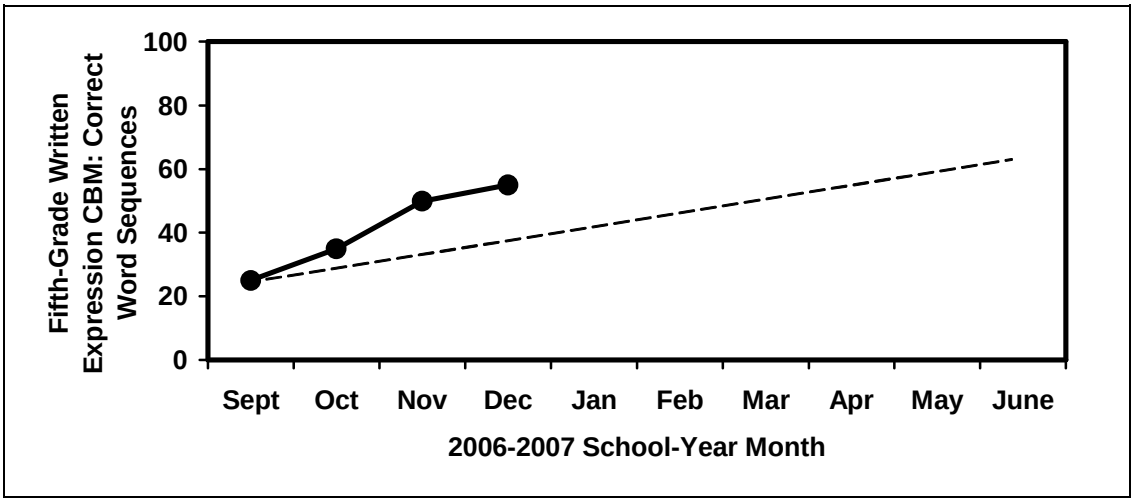


Figure 46. Chad Listerman

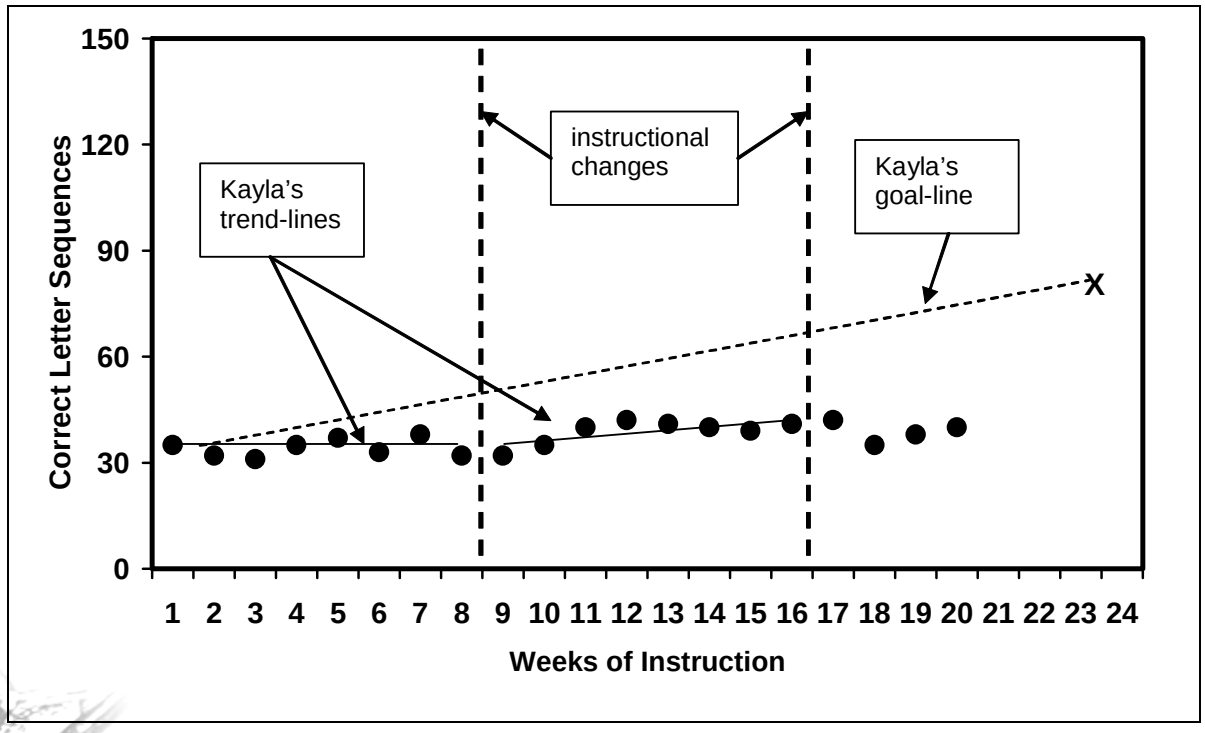


CBM Case Study #2: Kayla

Mrs. Atkinson has been using CBM to monitor the progress of all of the students in her classroom for the entire school year. She has one student, Kayla, who has been performing extremely below her classroom peers, even after two instructional changes.

Look at Kayla's CBM graph (Figure 47).

Figure 47. Kayla's CBM Graph



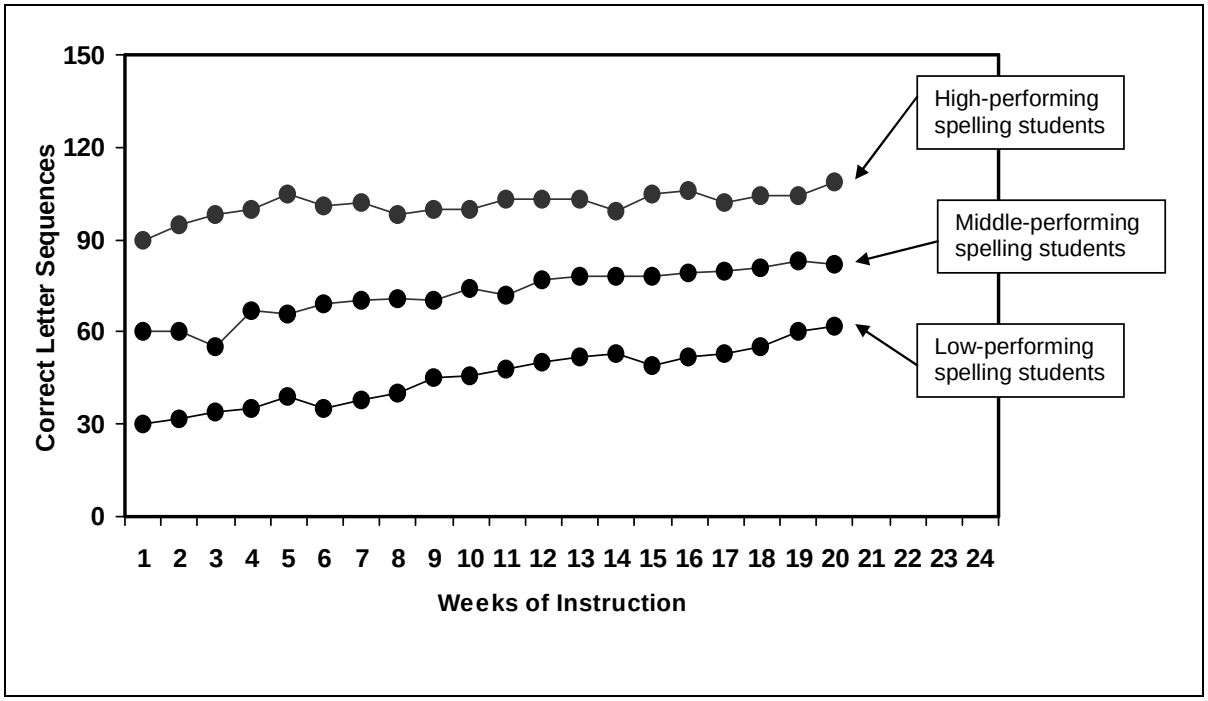
After eight weeks, Mrs. Atkinson determined that Kayla's trend-line was flatter than her goal-line, so Mrs. Atkinson made an instruction change to Kayla's spelling instruction.

The instructional change included having Kayla work on small sets of sight word flash cards. The instructional change occurred after the first thick, dashed vertical line on Kayla's graph.

After another eight weeks, Mrs. Atkinson reevaluated Kayla's spelling progress. She saw that Kayla's trend-line was still flatter than her goal-line. The graph showed that Kayla made very slight spelling improvement, but not enough improvement to help meet her end-of-year goal. So, Mrs. Atkinson decided another instructional change was needed. The instructional change included providing Kayla with individual instruction on vowel sounds. The point of this change is marked by the second thick, dashed vertical line on Kayla's graph.

Mrs. Atkinson has been conducting Spelling CBM for 20 weeks and still has yet to see any improvement with Kayla's spelling despite two instructional changes. Look at the graph below. What could this graph tell about Kayla? If you are meeting with the school principal and IEP team members, what would you say to describe Kayla's situation? What would you recommend as the next steps? How could Mrs. Atkinson use this class graph (Figure 48) to help her with her decisions about Kayla?

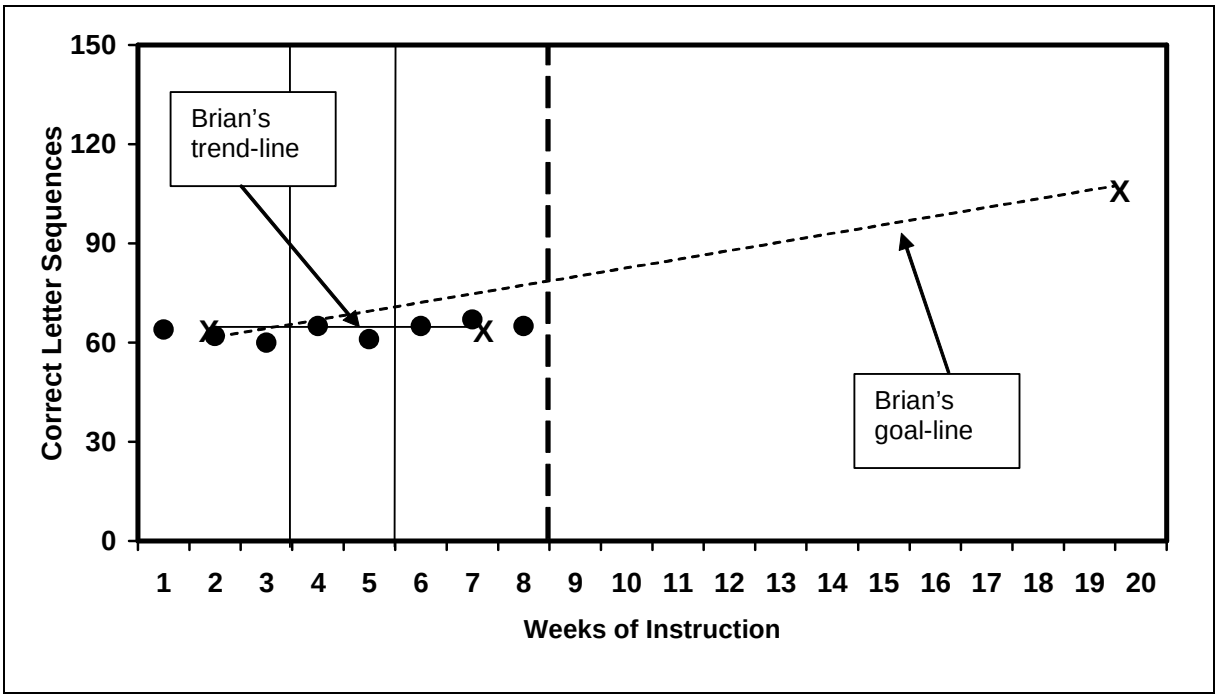
Figure 48. Mrs. Atkinson's CBM Class Report



CBM Case Study #3: Brian

Mr. Collins has been monitoring the spelling fluency of his entire third-grade class using weekly Spelling CBM probes. Mr. Collins has been scoring the probes by calculating correct letter sequences and then graphing student scores on individual student graphs. At the end of 8 weeks, Mr. Collins used the Tukey method to draw a trend-line for Brian's Spelling CBM graph. Here is Brian's graph (Figure 49).

Figure 49. Brian's Spelling CBM Graph



Brian's trend-line is flatter than his goal line. What should Mr. Collins do?

Mr. Collins needs to make a change to Brian's spelling instruction. The point of the instructional change has been marked with a dotted vertical line. To decide which instructional changes might benefit Brian, Mr. Collins decides to analyze Brian's last Spelling CBM probe to find his strengths and weaknesses as a speller (Figure 50).

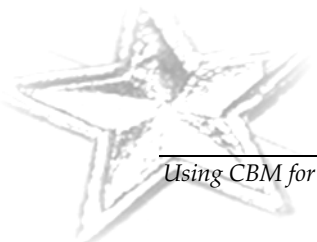
Figure 50. Brian's Spelling CBM Probe (Week 8)

Name: Brian	Date: November 8	LS
1. ^a^l a n	(along)	2
2. ^g^o s	(goose)	2
3. ^s^e^a c	(search)	3
4. ^b^e^n^t^	(bent)	5
5. k i k^	(quick)	1
6. ^s^t^o^p d^	(stopped)	5
7. ^t r^o n^	(thrown)	3
8. ^ v^i^s a t n	(visiting)	3
9. ^y u^r^s^e f^	(yourself)	5
10. ^e^n g o i	(enjoy)	2
11. ^c^h a r e	(cherry)	2
12. ^r^o^l	(role)	3
13. ^e r^l e	(early)	2
14. ^m^i^l c n	(milking)	3
15. ^s^t^a t^	(start)	4
16. ^m^o^p t	(mopped)	3
17. ^n^u^m^b r^	(number)	5
18. g^r^e	(agree)	2
19. ^f o w t^	(fault)	2
20. ^g^r^e t^	(greet)	4

Based on Brian's Spelling CBM, what instructional changes should Mr. Collins make to Brian's spelling instruction?

Some suggestions:

1. focus on silent 'e' at end of words,
2. focus on endings such as 'ed' and 'ing',
3. focus on double vowel combinations such as 'ee' in 'greet' or 'agree' or 'oo' in 'goose', and
4. focus on double consonant combinations such as 'pp' in 'stopped' or 'mopped'.



Appendix A: Resources

Deno, S. L. (1985). Curriculum-based measurement: The emerging alternative. *Exceptional Children, 52,* 219–232.

Deno, S. L., Fuchs, L.S., Marston, D., & Shin, J. (2001). Using curriculum-based measurement to establish growth standards for students with learning disabilities. *School Psychology Review, 30,* 507–524.

Deno, S. L., Marston, D., & Mirkin, P. (1982). Valid measurement procedures for continuous evaluation of written expression. *Exceptional Children Special Education and Pediatrics: A New Relationship, 48*, 368–371.

Deno, S. L., & Mirkin, P. K. (1977). *Data-based program modification: A manual*. Reston, VA: Council for Exceptional Children.

Deno, S. L., Mirkin, P., & Marston, D. (1980). *Relationships among simple measures of written expression and performance on standardized achievement tests* (Vol. IRLD-RR-22). University of Minnesota, Institute for Research on Learning Disabilities.

Espin, C. A., de La Paz, S., Scierka, B. J., & Roelofs, L. (2005). The relationship between curriculum-based measures in writing and quality and completeness of expository writing for middle school students. *Journal of Special Education, 38,* 208–217.

Espin, C. A., Scierka, B. J., Skare, S., & Halverson, N. (1999). Criterion-related validity of curriculum-based measures in writing for secondary school students. *Reading and Writing Quarterly, 15,* 5–27.

Espin, C. A., Shin, J., Deno, S. L., Skare, S., Robinson, S., & Benner, B. (2000). Identifying indicators of written proficiency for middle school students. *Journal of Special Education, 34,* 140–153.

Fewster, S., & MacMillan, P. D. (2002). School-based evidence for the validity of curriculum-based measurement of reading and writing. *Remedial and Special Education, 23,* 149–156.

Fuchs, L. S. (1987). Curriculum-based measurement for instructional program development. *Teaching Exceptional Children, 20,* 42–44.

Fuchs, L. S., & Deno, S. L. (1987). Developing curriculum-based measurement systems for data-based special education problem solving. *Focus on Exceptional Children, 19,* 1–16.

Fuchs, L. S., & Deno, S. L. (1991). Paradigmatic distinctions between instructionally relevant measurement models. *Exceptional Children, 57,* 488–501.

Fuchs, L. S., & Deno, S. L. (1994). Must instructionally useful performance assessment be based in the curriculum? *Exceptional Children, 61,* 15–24.

Fuchs, L. S., Deno, S. L., & Mirkin, P. K. (1984). Effects of frequent curriculum-based measurement of evaluation on pedagogy, student achievement, and student awareness of learning. *American Educational Research Journal, 21,* 449–460.

Fuchs, L. S., & Fuchs, D. (1990). Curriculum-based assessment. In C. Reynolds & R. Kamphaus (Eds.), *Handbook of psychological and educational assessment of children (Vol. 1): Intelligence and achievement.* New York: Guilford Press.

Fuchs, L. S., & Fuchs, D. (1996). Combining performance assessment and curriculum-based measurement to strengthen instructional planning. *Learning Disabilities Research and Practice, 11,* 183–192.

Fuchs, L. S., & Fuchs, D. (1998). Treatment validity: A unifying concept for reconceptualizing the identification of learning disabilities. *Learning Disabilities Research and Practice, 13,* 204–219.

Fuchs, L. S., & Fuchs, D. (2000). Curriculum-based measurement and performance assessment. In E. S. Shapiro & T. R. Kratochwill (Eds.), *Behavioral assessment in schools: Theory, research, and clinical foundations* (2nd ed., pp. 168–201). New York: Guilford.

Fuchs, L. S., & Fuchs, D. (2002). Curriculum-based measurement: Describing competence, enhancing outcomes, evaluating treatment effects, and identifying treatment nonresponders. *Peabody Journal of Education, 77,* 64–84.

Fuchs, L. S. & Fuchs, D. (2004). Determining Adequate Yearly Progress from kindergarten through grade 6 with curriculum-based measurement. *Assessment for Effective Instruction, 29,* 25–38.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (1989a). Effects of alternative goal structures within curriculum-based measurement. *Exceptional Children, 55,* 429–438.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (1989b). Effects of instrumental use of curriculum-based measurement to enhance instructional programs. *Remedial and Special Education, 10,* 43–52.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (1990). Curriculum-based measurement: A standardized long-term goal approach to monitoring student progress. *Academic Therapy, 25,* 615–632.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (1993). Technological advances linking the assessment of students' academic proficiency to instructional planning. *Journal of Special Education Technology, 12,* 49–62.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (1994). Strengthening the connection between assessment and instructional planning with expert systems. *Exceptional Children, 61,* 138–146.

Fuchs, L. S., Fuchs, D., & Hamlett, C. L. (2005). Using technology to facilitate and enhance curriculum-based measurement. In K. Higgins, R. Boone, & D. Edyburn (Eds.), *The*

Handbook of special education technology research and practice (pp. 663–681). Knowledge by Design, Inc.: Whitefish Bay, WI.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Allinder, R. M. (1991). Effects of expert system advice within curriculum-based measurement on teacher planning and student achievement in spelling. *School Psychology Review, 20,* 49–66.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Allinder, R. M. (1991). The contribution of skills analysis to curriculum-based measurement in spelling. *Exceptional Children, 57,* 443–452.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Phillips, N. B., & Karns, K. (1995). General educators' specialized adaptation for students with learning disabilities. *Exceptional Children, 61,* 440–459.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., Phillips, N. B., Karns, K., & Dutka, S. (1997). Enhancing students' helping behavior during peer-mediated instruction with conceptual mathematical explanations. *Elementary School Journal, 97,* 223–250.

Fuchs, L. S., Fuchs, D., Hamlett, C. L., & Stecker, P. M. (1991). Effects of curriculum-based measurement and consultation on teacher planning and student achievement in mathematics operations. *American Educational Research Journal, 28,* 617–641.

Fuchs, L. S., Fuchs, D., Hamlett, C. L, Walz, L., & Germann, G. (1993). Formative evaluation of academic progress: How much growth can we expect? *School Psychology Review, 22,* 27–48.

Fuchs, L.S., Fuchs, D., Hosp, M., & Hamlett, C.L. (2003). The potential for diagnostic analysis within curriculum-based measurement. *Assessment for Effective Intervention, 28,* 13–22.

Fuchs, L. S., Fuchs, D., Karns, K., Hamlett, C. L., Dutka, S., & Katzaroff, M. (2000). The importance of providing background information on the structure and scoring of performance assessments. *Applied Measurement in Education, 13,* 83–121.

Fuchs, L. S., Fuchs, D., Karns, K., Hamlett, C. L., & Katzaroff, M. (1999). Mathematics performance assessment in the classroom: Effects on teacher planning and student learning. *American Educational Research Journal, 36,* 609–646.

Fuchs, L. S., Fuchs, D., Karns, K., Hamlett, C. L., Katzaroff, M., & Dutka, S. (1997). Effects of task-focused goals on low-achieving students with and without learning disabilities. *American Educational Research Journal, 34,* 513–544.

Fuchs, D., Roberts, P. H., Fuchs, L. S., & Bowers, J. (1996). Reintegrating students with learning disabilities into the mainstream: A two-year study. *Learning Disabilities Research and Practice, 11,* 214–229.

Gansle, K. A., Noell, G. H., VanDerHayden, A. M., Naquin, G. M., & Slider, N. J. (2002). Moving beyond total words written: The reliability, criterion validity, and time cost of alternative measures for curriculum-based measurement in writing. *School Psychology Review, 31,* 477–497.

Gansle, K. A., Noell, G. H., Vanderheyden, A. M., Slider, N. J., Hoffpauir, L. D., & Whitmarsh, E. L. (2004). An examination of the criterion validity and sensitivity to brief intervention of alternate curriculum-based measures of writing skill. *Psychology in the Schools, 41*, 291–300.

Germann G., & Tindal, G. (1985). An application on curriculum-based assessment: The use of direct and repeated measurement. *Exceptional Children, 52,* 244–265.

Gersten, R., & Dimino, J. A. (2001). The realities of translating research into classroom practice. *Learning Disabilities Research and Practice, 16*, 120–130.

Gickling, E. E. (1981). The forgotten learner. *Nevada Public Affairs Review, 1,* 19–22.

Hosp, M. K., & Hosp, J. L. (2003) Curriculum-based measurement for reading, spelling, and math: How to do it and why. *Preventing School Failure, 48,* 10–17.

Hutton, J. B., Dubes, R., & Muir, S. (1992). Estimating trend progress in monitoring data: A comparison of simple line-fitting methods. *School Psychology Review, 21,* 300–312.

Jenkins, J. R., Mayhall, W., Peshka, C., & Townshend, V. (1974). Using direct and daily measures to measure learning. *Journal of Learning Disabilities, 10,* 604–608.

Jewell, J., & Malecki, C. K. (2005). The utility of CBM written language indices: An investigation of production-dependent, production-independent, and accurate-production scores. *School Psychology Review, 34*(1), 27–44.

Lembke, E., Deno, S. L., & Hall, K. (2003). Identifying an indicator of growth in early writing proficiency for elementary school students. *Assessment for Effective Intervention, 28*, 23–35.

Malecki, C. K., & Jewell, J. (2003). Developmental, gender, and practical considerations in scoring curriculum-based measurement writing probes. *Psychology in the Schools, 40,* 379–390.

Marston, D., & Deno, S. (1981). *The reliability of simple, direct measures of written expression* (Vol. IRLD-RR-50). U.S.; Minnesota.

Marston, D., Mirkin, P. K., & Deno, S. L. (1984). Curriculum-based measurement: An alternative to traditional screening, referral, and identification of learning disabilities of learning disabled students. *The Journal of Special Education, 18,* 109–118.

Marston, D. (1988). The effectiveness of special education: A time-series analysis of reading performance in regular and special education settings. *The Journal of Special Education, 21,* 13–26.

Parker, R. I., Tindal, G., & Hasbrouck, J. (1991). Progress monitoring with objective measures of writing performance for students with mild disabilities. *Exceptional Children, 58*, 61–73.

Parker, R. I., Tindal, G., & Hasbrouck, J. (1991). Countable indices of writing quality: Their suitability for screening-eligibility decisions. *Exceptionality, 2*, 1–17.

Phillips, N. B., Hamlett, C. L., Fuchs, L. S., & Fuchs, D. (1993). Combining classwide curriculum-based measurement and peer tutoring to help general educators provide adaptive education. *Learning Disabilities Research and Practice, 8,* 148–156.

Shinn, M. R. (Ed.). (1989). *Curriculum-based measurement: Assessing special children.* New York: Guilford Press.

Shinn, M. R., Tindal, G. A., & Stein, S. (1988). Curriculum-based measurement and the identification of mildly handicapped students: A research review. *Professional School Psychology, 3*, 69–86.

Stecker, P. M., & Fuchs, L. S. (2000). Effecting superior achievement using curriculum-based measurement: The importance of individual progress monitoring. *Learning Disabilities Research and Practice, 15,* 128–134.

Tindal, G., & Hasbrouck, J. (1991). Analyzing student writing to develop instructional strategies. *Learning Disabilities Research and Practice, 6*, 237–245.

Tindal, G., & Parker, R. (1989). Assessment of written expression for students in compensatory and special education programs. *Journal of Special Education, 23*, 169–183.

Tindal, G., & Parker, R. (1991). Identifying measures for evaluating written expression. *Learning Disabilities Research and Practice, 6*, 211–218.

Tindal, G., Wesson, C., Germann, G., Deno, S., & Mirkin, P. (1982). *A data-based special education delivery system: The Pine County Model*. (Monograph No. 19). Minneapolis: University of Minnesota, Institute for Research on Learning Disabilities.

Tucker, J. (1987). Curriculum-based assessment is not a fad. *The Collaborative Educator, 1,* 4, 10.

VanDerHeyden, A. M., Witt, J. C., Naquin, G., & Noell, G. (2001). The reliability and validity of curriculum-based measurement readiness probes for kindergarten students. *School Psychology Review, 30,* 368–382.

Videen, J., Deno, S. L., & Marston, D. (1982). *Correct word sequences: a valid indicator of proficiency in written expression* (Vol. IRLD-RR-84). University of Minnesota, Institute for Research on Learning Disabilities.

Watkinson, J. T., & Lee, S. W. (1992). Curriculum-based measures of written expression for learning-disabled and nondisabled students. *Psychology in the Schools, 29*, 184–192.

Wesson, C., Deno, S. L., Mirkin, P. K., Sevcik, B., Skiba, R., King, P. P., Tindal, G. A., & Maruyama, G. (1988). A causal analysis of the relationships among outgoing measurement and evaluation, structure of instruction, and student achievement. *The Journal of Special Education, 22*, 330–343.

Weissenburger, J. W., & Espin, C. A. (2005). Curriculum-based measures of writing across grade levels. *Journal of School Psychology, 43*, 153–169.