Manual

Using Curriculum Based Measurements in Response to Intervention Framework:

*Other ways to use Curriculum Based Measurement Data*

Lynn S. Fuchs and Douglas Fuchs
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How to Use the Curriculum-Based Measurement 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 timeframe.

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 2013–2014 school year. CBM can be used to fulfill the AYP evaluation in reading, math, written expression and 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 are simple to administer and teachers 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 multilevel monitoring can transform AYP from a procedural compliance burden into a useful tool for (a) guiding education reform at the school level; (b) guiding individual teacher’s instructional decision making related to their math programs; and (c) ensuring that the math progress of individual students is maximized.

CBM provides a multilevel monitoring system that helps schools ensure greater levels of academic success. Several examples of how CBM can be used in conjunction with a school’s AYP follow.
CBM can be used to monitor across-year progress in achieving AYP and progress toward achieving universal proficiency by the 2013–2014 deadline (Figure 1).

**Figure 1. Across-Year School Progress**

![Graph showing across-year school progress](image)

CBM can be used to monitor a school’s within-year progress toward achieving the AYP for the year (Figure 2).

**Figure 2. Within-Year School Progress**

![Graph showing within-year school progress](image)
CBM can be used to monitor a teacher’s within-year progress (Figure 3).

**Figure 3. Within-Year Teacher Progress**

CBM can be used to monitor a school’s special education performance within a school year (Figure 4).

**Figure 4. Within-Year Special Education Progress**
CBM can be used to monitor a student’s within-year progress (Figure 5).

**Figure 5. Within-Year Student Progress**

![Graph showing within-year student progress](image)

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

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

A CBM report like the one shown in Figures 6–8 provides the teacher with information about her class.

The first page of the CBM Class Report shows three lines: one for the progress of the lower-performing readers, another for the middle-performing readers, and one for the higher-performing readers (Figure 6). The report also gives teachers a list of students to watch. These are students who are in the bottom 25% of the class.

Figure 6. Sample CBM Teacher Report for Maze Fluency: Page 1

<table>
<thead>
<tr>
<th>CLASS GRAPH</th>
</tr>
</thead>
<tbody>
<tr>
<td>School: Westgate</td>
</tr>
<tr>
<td>Teacher: Smith</td>
</tr>
<tr>
<td>12/20/03</td>
</tr>
</tbody>
</table>

Students to Watch (lowest 25%):
- Michael Cox
- David Perry
- Alan Craig
- LaShonda Jones
- Carson Wilkins
- Dana Sommers
The second page of the CBM Class Report provides teachers with a list of each student’s CBM Maze Fluency raw score, the percentage of words read correctly, and the slope of the student’s CBM graph (Figure 7).

**Figure 7. Sample CBM Teacher Report for Maze Fluency: Page 2**

<table>
<thead>
<tr>
<th>Name</th>
<th>Score</th>
<th>Percent</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jason Dunning</td>
<td>37</td>
<td>100%</td>
<td>+1.44</td>
</tr>
<tr>
<td>Katherine Rogers</td>
<td>33</td>
<td>94%</td>
<td>+1.57</td>
</tr>
<tr>
<td>Lee Tang</td>
<td>26</td>
<td>98%</td>
<td>+0.96</td>
</tr>
<tr>
<td>Andy Farrell</td>
<td>25</td>
<td>98%</td>
<td>+1.72</td>
</tr>
<tr>
<td>Stephanie Sampras</td>
<td>21</td>
<td>98%</td>
<td>+1.17</td>
</tr>
<tr>
<td>Julie Page</td>
<td>20</td>
<td>98%</td>
<td>+1.36</td>
</tr>
<tr>
<td>William Curtis</td>
<td>18</td>
<td>95%</td>
<td>+0.91</td>
</tr>
<tr>
<td>Jimmy Smithson</td>
<td>18</td>
<td>90%</td>
<td>+0.53</td>
</tr>
<tr>
<td>Caleb Jacobs</td>
<td>18</td>
<td>92%</td>
<td>+0.77</td>
</tr>
<tr>
<td>Eddie Danforth</td>
<td>15</td>
<td>91%</td>
<td>+0.82</td>
</tr>
<tr>
<td>Meagam MacKenzie</td>
<td>13</td>
<td>84%</td>
<td>+0.88</td>
</tr>
<tr>
<td>Adrian Alexander</td>
<td>12</td>
<td>81%</td>
<td>+0.35</td>
</tr>
<tr>
<td>Bryan Gunter</td>
<td>11</td>
<td>96%</td>
<td>+0.74</td>
</tr>
<tr>
<td>Kai-Yun Nguyen</td>
<td>10</td>
<td>70%</td>
<td>+0.49</td>
</tr>
<tr>
<td>Brad Williams</td>
<td>10</td>
<td>78%</td>
<td>+0.70</td>
</tr>
<tr>
<td>Shawn Brooks</td>
<td>9</td>
<td>73%</td>
<td>+0.56</td>
</tr>
<tr>
<td>Mark Mason</td>
<td>7</td>
<td>71%</td>
<td>-0.09</td>
</tr>
<tr>
<td>Alex Davis</td>
<td>7</td>
<td>100%</td>
<td>+0.48</td>
</tr>
<tr>
<td>Michael Cox</td>
<td>7</td>
<td>82%</td>
<td>+0.60</td>
</tr>
<tr>
<td>David Perry</td>
<td>6</td>
<td>86%</td>
<td>+0.48</td>
</tr>
<tr>
<td>Alan Craig</td>
<td>6</td>
<td>71%</td>
<td>+0.31</td>
</tr>
<tr>
<td>LaShonda Jones</td>
<td>5</td>
<td>65%</td>
<td>-0.20</td>
</tr>
<tr>
<td>Carson Wilkins</td>
<td>4</td>
<td>80%</td>
<td>+0.11</td>
</tr>
<tr>
<td>Dana Sommers</td>
<td>3</td>
<td>64%</td>
<td>+0.05</td>
</tr>
</tbody>
</table>
The third page of the CBM Class Report provides teachers with an average of the students in the classroom and identifies students who are performing below their classroom peers both in terms of the level (“score”) of their CBM performance and their rate (“slope”) of CBM improvement (Figure 8).

**Figure 8. Sample CBM Teacher Report for Maze Fluency: Page 3**

<table>
<thead>
<tr>
<th>CLASS STATISTICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>School: Westgate</td>
</tr>
<tr>
<td>Teacher: Smith</td>
</tr>
<tr>
<td>12/20/03</td>
</tr>
</tbody>
</table>

**Score**

- Average score: 14.5
- Standard deviation: 9.2
- Discrepancy criterion: 5.3

**Slope**

- Average Slope: +0.70
- Standard deviation: 0.50
- Discrepancy criterion: +0.20

<table>
<thead>
<tr>
<th>Students identified with dual discrepancy criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
</tr>
<tr>
<td>Carson Wilkins</td>
</tr>
<tr>
<td>Dana Sommers</td>
</tr>
</tbody>
</table>

For more information on using CBM in general education, see:

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 module Using Curriculum Based Measurement in a Responsiveness-to-Intervention framework, within this series.

**Curriculum-Based Measurement Case Study 1: Darby Valley Elementary**

Mr. Singh is the principal of Darby Valley Elementary School. He has decided, along with the school teachers and district administration, to use CBM to monitor AYP toward the school’s No Child Left Behind proficiency goal.

During 2002–2003 school year, all 378 students at the school were assessed using CBM Passage Reading Fluency at the appropriate grade level. A total of 125 students initially met CBM benchmarks; therefore, 125 represents Darby Valley’s initial proficiency status. The discrepancy between initial proficiency and universal proficiency is 253 students. To find the number of students who must meet CBM benchmarks each year before the 2013–2014 deadline, the discrepancy of 253 students is divided by the number of years until the deadline (11): 253 ÷ 11 = 23. Twenty-three students need to meet CBM benchmarks each year in order for the school to demonstrate AYP.

During the 2003–2004 school year, Mr. Singh is provided with these CBM graphs based on the performance of the students in his school.
Based on the graph in Figure 9, what can Mr. Singh decide about his school’s progress since the initial year of benchmarks?

**Figure 9. Darby Valley Elementary—Across-Year School Progress**

Based on the graph in Figure 10, what can Mr. Singh decide about his school’s progress since the beginning of the school year?

**Figure 10. Darby Valley Elementary—Within-Year School Progress**
Mr. Singh receives the next two graphs (Figures 11 and 12) from two different second-grade teachers. What information can he gather from these graphs?

**Figure 11. Darby Valley—Ms. Main**

![Graph showing the number of students on track to meet CBM benchmarks for Darby Valley—Ms. Main.](image)

**Figure 12. Darby Valley Elementary—Mrs. Hamilton**

![Graph showing the number of students on track to meet CBM benchmarks for Darby Valley Elementary—Mrs. Hamilton.](image)
Figure 13 is the graph that Mr. Singh receives based on the performance of Darby Valley’s special education students. What should he learn from this graph?

**Figure 13. Darby Valley Elementary—Within-Year Special Education Progress**

Mr. Singh receives a graph for every student in the school (Figures 14 and 15). He gives these graphs to the respective teachers of each student. How can the teachers use the graphs?

**Figure 14. Cynthia Davis**
Figure 15. Dexter Wilson
Curriculum-Based Measurement Case Study 2: Mrs. Smith

Mrs. Smith has conducted CBM since the beginning of the school year with all of the students in her classroom. She has received the following printout from the progress monitoring computer software program.

Figure 16 presents the first page of Mrs. Smith’s CBM class report. How would you characterize how her class is doing? How can she use this information to improve the math of the students in her classroom?

Figure 16. Curriculum-Based Measurement Class Report for Mrs. Smith—Page 1

CLASS SUMMARY
Teacher: Mrs. Smith
Report through 3/17

Students to Watch
Jonathan Nichols
Amanda Ramirez
Anthony Jones
Erica Jernigan

Most Improved
Michael Elliott
Jonathan Nichols
Michael Sanders
Matthew Hayes

Areas of Improvement: Computation
M1 Multiplying basic facts
M2 Multiplying by 1 digit
M3 Multiplying by 2 digits
D1 Dividing basic facts

Whole Class Instruction: Computation
M3 Multiplying by 2 digits
58% of your students are either COLD or COOL on this skill.

Small Group Instruction: Computation
S1 Subtracting
Cindy Lincoln
Kaitlin Laird
Michael Elliott
Michael Sanders
Figure 17 presents the second page of Mrs. Smith’s class report. How can she use this class report to improve her classroom instruction?

**Figure 17. Curriculum-Based Measurement Class Report for Mrs. Smith—Page 2**

<table>
<thead>
<tr>
<th>Name</th>
<th>Score</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samantha Spain</td>
<td>57</td>
<td>+1.89</td>
</tr>
<tr>
<td>Aroun Phung</td>
<td>56</td>
<td>+1.60</td>
</tr>
<tr>
<td>Gary McKnight</td>
<td>54</td>
<td>+1.14</td>
</tr>
<tr>
<td>Yasmine Sallee</td>
<td>53</td>
<td>+1.34</td>
</tr>
<tr>
<td>Kathy Taylor</td>
<td>53</td>
<td>+1.11</td>
</tr>
<tr>
<td>Jung Lee</td>
<td>53</td>
<td>+1.23</td>
</tr>
<tr>
<td>Matthew Hayes</td>
<td>51</td>
<td>+1.00</td>
</tr>
<tr>
<td>Emily Waters</td>
<td>48</td>
<td>+1.04</td>
</tr>
<tr>
<td>Charles McBride</td>
<td>43</td>
<td>+1.12</td>
</tr>
<tr>
<td>Michael Elliott</td>
<td>42</td>
<td>+0.83</td>
</tr>
<tr>
<td>Jenna Clover</td>
<td>42</td>
<td>+0.78</td>
</tr>
<tr>
<td>Becca Jarrett</td>
<td>41</td>
<td>+1.14</td>
</tr>
<tr>
<td>David Anderson</td>
<td>38</td>
<td>+0.79</td>
</tr>
<tr>
<td>Cindy Lincoln</td>
<td>36</td>
<td>+1.04</td>
</tr>
<tr>
<td>Kailin Laird</td>
<td>35</td>
<td>+0.71</td>
</tr>
<tr>
<td>Victoria Dillard</td>
<td>34</td>
<td>+0.64</td>
</tr>
<tr>
<td>Vicente Gonzalez</td>
<td>29</td>
<td>+0.28</td>
</tr>
<tr>
<td>Adam Qualls</td>
<td>26</td>
<td>+0.60</td>
</tr>
<tr>
<td>Michael Sanders</td>
<td>25</td>
<td>+0.70</td>
</tr>
<tr>
<td>Jonathan Nichols</td>
<td>25</td>
<td>+2.57</td>
</tr>
<tr>
<td>Amanda Ramirez</td>
<td>23</td>
<td>+0.85</td>
</tr>
<tr>
<td>Anthony Jones</td>
<td>19</td>
<td>+0.05</td>
</tr>
<tr>
<td>Erica Jamigan</td>
<td>18</td>
<td>+0.23</td>
</tr>
</tbody>
</table>
Figure 18 presents the third page of Mrs. Smith’s class report. What information does she learn on this page? How can she use this information?

**Figure 18. Curriculum-Based Measurement Class Report for Mrs. Smith—Page 3**

![Figure 18](image-url)
Figure 19 presents the fourth page of Mrs. Smith’s class report. What information does she learn on this page?

**Figure 19. Curriculum-Based Measurement Class Report for Mrs. Smith—Page 4**

<table>
<thead>
<tr>
<th>CLASS STATISTICS: Computation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher: Mrs. Smith</td>
</tr>
<tr>
<td>Report through 3/17</td>
</tr>
</tbody>
</table>

**Score**
- Average score: 39.5
- Standard deviation: 12.6
- Discrepancy criterion: 26.9

**Slope**
- Average slope: +0.98
- Standard deviation: 0.53
- Discrepancy criterion: +0.45

**Students identified with dual discrepancy criterion**

<table>
<thead>
<tr>
<th>Name</th>
<th>Score</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthony Jones</td>
<td>19.0</td>
<td>+0.05</td>
</tr>
<tr>
<td>Erica Jernigan</td>
<td>18.0</td>
<td>+0.23</td>
</tr>
</tbody>
</table>
Appendix A: CBM Resources

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

AIMSweb / Edformation (Reading and Math CBM)

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

http://www.aimsweb.com or http://www.edformation.com
Phone: 888-944-1882
Mail: Edformation, Inc.
6420 Flying Cloud Drive, Suite 204
Eden Prairie, MN 55344

DIBELS (Reading CBM)

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

http://dibels.uoregon.edu/

Edcheckup (Reading and Math CBM)

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

http://www.edcheckup.com
Phone: 952-229-1440
Mail: WebEdCo
7701 York Avenue South, Suite 250
Edina, MN 55435

McGraw-Hill (Reading and Math CBM)

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

http://www.mhdigitallearning.com
Phone: 1-800-848-1567, ext. 4928
**University of Maryland (Reading CBM)**

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

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

**Pro-Ed Math Computation and Concepts/Applications CBM**

These CBM materials were developed and researched using standard CBM procedures. Curriculum-Based Math Computation Probes include 30 alternate forms at each grade level for grades 1-6. Curriculum-Based Math Concepts/Applications Probes include 30 alternate forms at each grade level for grades 2-6. Each comes with a manual that provides supporting information (e.g., technical information, directions for administration, and scoring keys).

Phone: (512) 451-3246
Web site: www.proedinc.com
Mail: 8700 Shoal Creek Blvd
Austin, TX 78757

**Vanderbilt University (Reading CBM)**

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

Phone: 615-343-4782
Email: flora.murry@vanderbilt.edu
Mail: Flora Murray
Peabody #328
230 Appleton Place
Nashville, TN 37203-5721

Other Ways to Use CBM Data
Appendix B: Resources


