

# Using Curriculum-Based Measurement to Measure Response to Intervention

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*New York State Federation of the Council for Exceptional Children  
2005 Annual Convention/Pre-convention Workshop  
Long Island Marriott, Melville, NY  
27 October 2005*



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## Five Interventions that Work

≡ **Leadership Compass** » Volume 2 Number 4, Summer 2005 » page(s) 4,6

by Jim Wright

The quality of a school as a learning community can be measured by how effectively it addresses the needs of struggling students. Children who enter the primary grades with significant barriers to learning—such as gaps in their readiness skills—are at significantly higher risk of poor school performance than their non-struggling peers. Faced with limited resources, teachers and administrators must find imaginative ways to accommodate these difficult-to-teach students. Here are five suggestions schools can use in developing successful academic interventions.

***For skill problems, determine the student's current phase of learning.*** A common misconception is that learning is a simple, one-step process in which the student moves from not knowing to knowing. In fact, the act of learning falls into three distinct phases of instructional hierarchy.

***Acquisition.*** The student has begun to learn the target skill but is not yet accurate or fluent.

***Fluency-building.*** The student can perform the target skill accurately but must put effort into increasing performance speed.

***Generalization.*** The student can now use the skill in new situations or settings where it is needed.

Academic interventions are likely to be most effective when they match the student's current phase of learning. Specific intervention strategies tied to the instructional hierarchy can be found at [www.jimwrightonline.com/pdfdocs/instrhier.pdf](http://www.jimwrightonline.com/pdfdocs/instrhier.pdf).

***Adopt evidence-based intervention strategies.*** Academic interventions will have a higher chance of success if they are based on sound empirical research. With their many other responsibilities, however, teachers and principals can find it challenging to keep abreast of educational research into effective intervention techniques. The Web site *Big Ideas in Beginning Reading* is one excellent source for “best practice” reading interventions in the early grades. Sponsored by the University of Oregon's Institute for the Development of Educational Achievement, it is built around the five big ideas in beginning reading—phonemic awareness, the alphabetic principle, fluency, vocabulary, and comprehension—and offers strategies for teaching each of them at [www.reading.uoregon.edu/instruction/instruc\\_guide.php](http://www.reading.uoregon.edu/instruction/instruc_guide.php).

Another source for empirically validated instructional strategies is the *What Works Clearinghouse* ([www.w-w-c.org](http://www.w-w-c.org)), sponsored by the U.S. Department of Education. Finally, *Intervention Central* ([www.interventioncentral.org](http://www.interventioncentral.org)) contains a large number of research-based teacher intervention scripts that target reading fluency and comprehension, good study habits, improved student motivation, and other academic goals.

***Train staff to collect frequent progress-monitoring data.*** When teachers regularly measure the academic progress and behaviors of struggling learners, they quickly discover whether their academic interventions are successful. Curriculum-based measurement (CBM) is one widely used, classroom-friendly method for monitoring whether interventions result in improved academic skills. CBM assesses a student's accuracy and speed in targeted basic academic areas such as reading fluency, math computation, writing, spelling, and pre-literacy skills. A large collection of CBM resources can be found online at [www.interventioncentral.org/htmldocs/interventions/cbmwarehouse.shtml](http://www.interventioncentral.org/htmldocs/interventions/cbmwarehouse.shtml).

Teachers also can measure the behavior of struggling learners on a daily basis by using classroom behavior report cards. These simple, convenient rating forms can help track a child's work completion, attention to task, compliance with teacher directions, and other behaviors that influence learning. A free copy of the Classroom Behavior Report Card Resource Book, containing a number of ready-to-use report cards, can be downloaded from [www.interventioncentral.org/htmldocs/interventions/behrtcd.shtml](http://www.interventioncentral.org/htmldocs/interventions/behrtcd.shtml).

***Develop building-level intervention programs to address common academic concerns.*** Schools are often faced with large numbers of students with shared academic concerns. For example, there are many children in the early primary grades that have difficulty decoding text. Creating customized interventions for each slow reader might quickly exhaust a school's intervention resources. One solution is to create a building-level intervention program to meet this need. For example, older children could tutor younger students by using simple, research-based techniques to boost their tutees' reading fluency. Detailed training materials to start such a cross-age peer tutoring program can be downloaded at no cost from [www.interventioncentral.org/htmldocs/interventions/rdngfluency/prtutor.shtml](http://www.interventioncentral.org/htmldocs/interventions/rdngfluency/prtutor.shtml).

***Establish a building intervention team.*** A very effective way to promote quality interventions is to establish a building intervention team. Made up of teachers and support staff, the intervention team can help referring teachers design feasible strategies for struggling students. Intervention teams also foster a sense of collegiality and mutual support among educators, promote the use of evidence-based interventions, and assist busy teachers in carrying out intervention plans. Free training materials for one highly successful intervention team model can be accessed at [www.interventioncentral.org/htmldocs/interventions/sbit.shtml](http://www.interventioncentral.org/htmldocs/interventions/sbit.shtml).

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### **Administration of CBM reading probes**

The examiner and the student sit across the table from each other. The examiner hands the student the unnumbered copy of the CBM reading passage. The examiner takes the numbered copy of the passage, shielding it from the student's view.

The examiner says to the student:

*When I say, 'start,' begin reading aloud at the top of this page. Read across the page [demonstrate by pointing]. Try to read each word. If you come to a word you don't know, I'll tell it to you. Be sure to do your best reading. Are there any questions?*

[Pause] *Start.*

The examiner begins the stopwatch when the student says the first word. If the student does not say the initial word within 3 seconds, the examiner says the word and starts the stopwatch. As the student reads along in the text, the examiner records any errors by marking a slash (/) through the incorrectly read word. If the student hesitates for 3 seconds on any word, the examiner says the word and marks it as an error. At the end of 1 minute, the examiner says, *Stop* and marks the student's concluding place in the text with a bracket ( ] ).

### **Scoring**

Reading fluency is calculated by first determining the total words attempted within the timed reading probe and then deducting from that total the number of incorrectly read words.

The following scoring rules will aid the instructor in marking the reading probe:

- ➔ Words read correctly are scored as correct:
  - Self-corrected words are counted as correct.
  - Repetitions are counted as correct.
  - Examples of dialectical speech are counted as correct.
  - Inserted words are ignored.
  
- ➔ Mispronunciations are counted as errors.

#### **Example**

Text: The small gray fox ran to the cover of the trees.

Student: "The smill gray fox ran to the cover of the trees."

- ➔ Substitutions are counted as errors.

Example

Text: When she returned to the house, Grandmother called for Franchesca.

Student: "When she returned to the home, Grandmother called for Franchesca.

- Omissions are counted as errors.

Example

Text: Anna could not compete in the last race.

Student: "Anna could not in the last race."

- Transpositions of word-pairs are counted as 1 error.

Example

Text: She looked at the bright, shining face of the sun.

Student: "She looked at the shining bright face of the sun."

- Words read to the student by the examiner after 3 seconds have gone by are counted as errors.

One hundred years ago in Paris, when theaters and music halls	11
drew traveling players from all over the world, the best place to	23
stay was at the widow Gateau's, a boardinghouse on English	33
Street. Acrobats, jugglers, actors, and mimes from as far away	43
as Moscow and New York reclined on the widow's feather	53
mattresses and devoured her kidney stews. Madame Gateau	61
worked hard to make her guests comfortable, and so did her	72
daughter, Mirette. The girl was an expert at washing linens,	82
chopping leeks, paring potatoes, and mopping floors. She was	91
a good listener too. Nothing pleased her more than to overhear	102
the vagabond players tell of their adventures in this town and	113
that along the road.	117

Harcourt Brace Signatures Series 1999  
Level 4-1 Rare Finds  
Mirette on the High Wire pp. 87

One hundred years ago in Paris, when theaters and music halls drew traveling players from all over the world, the best place to stay was at the widow Gateau's, a boardinghouse on English Street. Acrobats, jugglers, actors, and mimes from as far away as Moscow and New York reclined on the widow's feather mattresses and devoured her kidney stews. Madame Gateau worked hard to make her guests comfortable, and so did her daughter, Mirette. The girl was an expert at washing linens, chopping leeks, paring potatoes, and mopping floors. She was a good listener too. Nothing pleased her more than to overhear the vagabond players tell of their adventures in this town and that along the road.

Harcourt Brace Signatures Series 1999  
Level 4-1 Rare Finds  
Mirette on the High Wire pp. 87

Someone is lost in the woods. He might be hurt, or the weather	13
could turn bad. It is important to find him as fast as possible.	26
But he didn't follow a trail, and footprints don't show on the	38
forest floor. What to do? Call in the search and rescue dogs.	50
Dogs have a very fine sense of smell. They can find people lost	63
by following their scents, because each person has his or her	74
own, unique scent. Panda is a Newfoundland dog trained to	84
locate lost people. She and her owner, Susie Foley, know how	95
to search through the woods, under the snow, or in the water.	107

Harcourt Brace Signatures Series 1999  
Level 4-1 Rare Finds  
Hugger to the Rescue pp. 143-144



Someone is lost in the woods. He might be hurt, or the weather could turn bad. It is important to find him as fast as possible. But he didn't follow a trail, and footprints don't show on the forest floor. What to do? Call in the search and rescue dogs. Dogs have a very fine sense of smell. They can find people lost by following their scents, because each person has his or her own, unique scent. Panda is a Newfoundland dog trained to locate lost people. She and her owner, Susie Foley, know how to search through the woods, under the snow, or in the water.

Harcourt Brace Signatures Series 1999  
Level 4-1 Rare Finds  
Hugger to the Rescue pp. 143-144

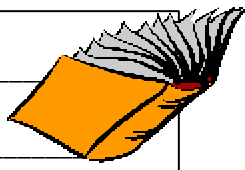
In the busy rain forest of Malaysia, a grasshopper leaps into a	12
spray of orchids. Suddenly, one of the “flowers” turns on the	23
grasshopper. An orchid mantis, with wings like petals, grips it	33
tightly. For the grasshopper, there will be no escape. The	43
orchid mantis is a master of camouflage – the art of hiding while	55
in plain sight. Camouflage enables predators like the orchid	64
mantis to hide while they lie in wait for their prey. For other	77
animals, camouflage is a method of protection from their	86
enemies. Animals blend into the background in several ways.	95
Their colors and patterns may match their surroundings.	103

Harcourt Brace Signatures Series 1999  
Level 4-1 Rare Finds  
Hiding Out pp. 270

In the busy rain forest of Malaysia, a grasshopper leaps into a spray of orchids. Suddenly, one of the “flowers” turns on the grasshopper. An orchid mantis, with wings like petals, grips it tightly. For the grasshopper, there will be no escape. The orchid mantis is a master of camouflage – the art of hiding while in plain sight. Camouflage enables predators like the orchid mantis to hide while they lie in wait for their prey. For other animals, camouflage is a method of protection from their enemies. Animals blend into the background in several ways. Their colors and patterns may match their surroundings.

Harcourt Brace Signatures Series 1999  
Level 4-1 Rare Finds  
Hiding Out pp. 270

# Student Record Form: Curriculum-Based Measurement: Oral Reading Fluency



Student Name: \_\_\_\_\_ Grade/Classroom: \_\_\_\_\_

Reading Skill Level: \_\_\_\_\_ Best Time(s) for CBM Monitoring: \_\_\_\_\_

**Step 1: Conduct a Survey-Level Assessment:** Use this section to record the student's reading rates in progressively more difficult material.

Date: \_\_\_\_\_ Book/Reading Level: \_\_\_\_\_

	TRW	E	CRW	%CRW
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

Date: \_\_\_\_\_ Book/Reading Level: \_\_\_\_\_

	TRW	E	CRW	%CRW
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

Date: \_\_\_\_\_ Book/Reading Level: \_\_\_\_\_

	TRW	E	CRW	%CRW
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

Date: \_\_\_\_\_ Book/Reading Level: \_\_\_\_\_

	TRW	E	CRW	%CRW
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

Date: \_\_\_\_\_ Book/Reading Level: \_\_\_\_\_

	TRW	E	CRW	%CRW
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

Date: \_\_\_\_\_ Book/Reading Level: \_\_\_\_\_

	TRW	E	CRW	%CRW
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

Date: \_\_\_\_\_ Book/Reading Level: \_\_\_\_\_

	TRW	E	CRW	%CRW
A.	_____	_____	_____	_____
B.	_____	_____	_____	_____
C.	_____	_____	_____	_____

**Table 1: Sample Estimates of 'Typical' CBM Instructional Reading Levels By Grade**

Grade	Shapiro (1996)		Milwaukee Public Schools (Winter 2000-2001 Local Norms) CRW Per Min for Students in 25 <sup>th</sup> -75 <sup>th</sup> Percentile
	CRW Per Min	Reading Errors	
1.....	40-60	Fewer than 5	22-64
2.....	40-60	Fewer than 5	36-78
3.....	70-100	Fewer than 7	47-88
4.....	70-100	Fewer than 7	60-104
5.....	70-100	Fewer than 7	77-121
6.....	70-100	Fewer than 7	95-146

**Step 2: Compute a Student Reading Goal**

- At what grade or book level will the student be monitored?  
(Refer to results of Step 1: *Survey-Level Assessment*)  
\_\_\_\_\_
- What is the student's *baseline* reading rate (# correctly read words per min)? \_\_\_\_\_ CRW Per Min
- When is the *start date* to begin monitoring the student in reading? \_\_\_\_ / \_\_\_\_ / \_\_\_\_
- When is the *end date* to stop monitoring the student in reading? \_\_\_\_ / \_\_\_\_ / \_\_\_\_
- How many instructional weeks are there between the start and end dates? (Round to the nearest week if necessary):  
\_\_\_\_\_ Instructional Weeks
- What do you *predict* will be the student's average increase in correctly read words per minute will be for each instructional week of the monitoring period? (See Table 2):  
\_\_\_\_\_ Weekly Increase in CRW Per Min
- What will the student's predicted CRW *gain* in reading fluency be at the end of monitoring?  
(Multiply Item 5 by Item 6): \_\_\_\_\_
- What will the student's predicted *reading rate* be at the end of the monitoring period? (Add Items 2 & 7): \_\_\_\_\_ CRW Per Min

**References**

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.

Shapiro, E.S. (1996). *Academic skills problems: Direct assessment and intervention*. New York: Guilford Press.

Student Name: \_\_\_\_\_ Grade/Classroom: \_\_\_\_\_

<b>Step 2: Collect Baseline Data:</b> Give 3 CBM reading assessments within a one-week period using monitoring-level probes.																												
<b>Baseline 1</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>Baseline 2</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>Baseline 3</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>Step 3: Complete CBM Progress-Monitoring Weekly or More Frequently:</b> Record the results of regular monitoring of the student's progress in reading fluency.																												
<b>1.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>2.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>3.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>4.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>5.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>6.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>7.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>8.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>9.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>10.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>11.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<b>12.</b>	Date: _____	Book/Reading Level: _____																										
	TRW	E	CRW	%CRW																								
	A. _____	_____	_____	_____																								
	B. _____	_____	_____	_____																								
	C. _____	_____	_____	_____																								
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="3" style="text-align: left;"><b>Table 2: Predictions for Rates of Reading Growth by Grade</b> (Fuchs, Fuchs, Hamlett, Walz, &amp; Germann, 1993) Increase in Correctly Read Words Per Minute for Each Instructional Week</th> </tr> <tr> <th style="text-align: left;">Grade Level</th> <th style="text-align: center;">Realistic Weekly Goal</th> <th style="text-align: center;">Ambitious Weekly Goal</th> </tr> </thead> <tbody> <tr> <td>Grade 1</td> <td style="text-align: center;">2.0</td> <td style="text-align: center;">3.0</td> </tr> <tr> <td>Grade 2</td> <td style="text-align: center;">1.5</td> <td style="text-align: center;">2.0</td> </tr> <tr> <td>Grade 3</td> <td style="text-align: center;">1.0</td> <td style="text-align: center;">1.5</td> </tr> <tr> <td>Grade 4</td> <td style="text-align: center;">0.85</td> <td style="text-align: center;">1.1</td> </tr> <tr> <td>Grade 5</td> <td style="text-align: center;">0.5</td> <td style="text-align: center;">0.8</td> </tr> <tr> <td>Grade 6</td> <td style="text-align: center;">0.3</td> <td style="text-align: center;">0.65</td> </tr> </tbody> </table>					<b>Table 2: Predictions for Rates of Reading Growth by Grade</b> (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993) Increase in Correctly Read Words Per Minute for Each Instructional Week			Grade Level	Realistic Weekly Goal	Ambitious Weekly Goal	Grade 1	2.0	3.0	Grade 2	1.5	2.0	Grade 3	1.0	1.5	Grade 4	0.85	1.1	Grade 5	0.5	0.8	Grade 6	0.3	0.65
<b>Table 2: Predictions for Rates of Reading Growth by Grade</b> (Fuchs, Fuchs, Hamlett, Walz, & Germann, 1993) Increase in Correctly Read Words Per Minute for Each Instructional Week																												
Grade Level	Realistic Weekly Goal	Ambitious Weekly Goal																										
Grade 1	2.0	3.0																										
Grade 2	1.5	2.0																										
Grade 3	1.0	1.5																										
Grade 4	0.85	1.1																										
Grade 5	0.5	0.8																										
Grade 6	0.3	0.65																										

## Curriculum-Based Assessment Wordlist: Student Copy

Student:

Date: \_\_\_\_\_

Class:

Correct Items: \_\_\_\_\_ Total Items Attempted: \_\_\_\_\_

---

like          said          brown          find

---

eight          long          carry          who

---

fast          any          cut          us

---

thank          hurt          pull          big

---

so          draw          take          much

---

which          my          down          the

---

why          put          be          please

---

after          read          am          from

---

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**Curriculum-Based  
Assessment List: Examiner  
Copy**

This answer key contains 32 items  
from the following assessment list(s):

- *Dolch Words*

Item 1 like		Item 2 said		Item 3 brown		Item 4 find		4/4
Item 5 eight		Item 6 long		Item 7 carry		Item 8 who		4/8
Item 9 fast		Item 10 any		Item 11 cut		Item 12 us		4/12
Item 13 thank		Item 14 hurt		Item 15 pull		Item 16 big		4/16
Item 17 so		Item 18 draw		Item 19 take		Item 20 much		4/20
Item 21 which		Item 22 my		Item 23 down		Item 24 the		4/24
Item 25 why		Item 26 put		Item 27 be		Item 28 please		4/28
Item 29 after		Item 30 read		Item 31 am		Item 32 from		4/32

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# Curriculum-Based Assessment Progress-Monitoring Data Recording Sheet

<b>Wordlist Identification:</b> _____
<b>Student Name:</b> _____ <b>Grade/Classroom:</b> _____

					<i>Missed Words/Notes</i>
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	
Date: _____	TRW: _____	E: _____	CRW: _____	%CRW: _____	

TRW= Total Read Words    E=Errors    CRW=Correctly Read Words    %CRW=Percent Accuracy (CRW/TRW)



### **Administration of CBM math probes**

The examiner distributes copies of one or more math probes to all the students in the group. (Note: These probes may also be administered individually). The examiner says to the students:

*The sheets on your desk are math facts.*

**If the students are to complete a single-skill probe, the examiner then says:** *All the problems are [addition or subtraction or multiplication or division] facts.*

**If the students are to complete a multiple-skill probe, the examiner then says:** *There are several types of problems on the sheet. Some are addition, some are subtraction, some are multiplication, and some are division [as appropriate]. Look at each problem carefully before you answer it.*

*When I say 'start,' turn them over and begin answering the problems. Start on the first problem on the left on the top row [point]. Work across and then go to the next row. If you can't answer the problem, make an 'X' on it and go to the next one. If you finish one side, go to the back. Are there any questions?*

**Say, Start.** The examiner starts the stopwatch.

While the students are completing worksheets, the examiner and any other adults assisting in the assessment circulate around the room to ensure that students are working on the correct sheet, that they are completing problems in the correct order (rather than picking out only the easy items), and that they have pencils, etc.

After 2 minutes have passed, the examiner says *Stop*. CBM math probes are collected for scoring.

### **Scoring**

The following scoring rules will aid the instructor in marking single- and multiple-skill math probes:

- ➔ Individual correct digits are counted as correct.
  - Reversed or rotated digits are not counted as errors unless their change in position makes them appear to be another digit (e.g., 9 and 6).
  
- ➔ Incorrect digits are counted as errors.
  - Digits which appear in the wrong place value, even if otherwise correct, are scored as errors.

Example:

$$\begin{array}{r} 97 \\ \times 9 \\ \hline 8730 \end{array}$$

"873" is the correct answer to this problem, but no credit can be given since the addition of the 0 pushes the other digits out of their proper place-value positions.

- ➔ The student is given credit for "place-holder" numerals that are included simply to correctly align the problem. As long as the student includes the correct space, credit is given whether or not a "0" has actually been inserted.

Example:

$$\begin{array}{r} 55 \\ \times 82 \\ \hline 110 \\ 4400 \\ \hline 4510 \end{array}$$

Since the student correctly placed 0 in the "place-holder" position, it is given credit as a correct digit. Credit would also have been given if the space were reserved but no 0 had been inserted.

- ➔ In more complex problems such as advanced multiplication, the student is given credit for all correct numbers that appear below the line.

Example:

$$\begin{array}{r} 33 \\ \times 28 \\ \hline 264 \\ 660 \\ \hline 924 \end{array}$$

Credit is given for all work below the line. In this example, the student earns credit for 9 correct digits.

- ➔ Credit is not given for any numbers appearing above the line (e.g., numbers marked at the top of number columns to signify regrouping).

Example:

$$\begin{array}{r} ① \\ 46 \\ + 39 \\ \hline 85 \end{array}$$

Credit is given for the 2 digits below the line. However, the carried "1" above the line does not get credit.

## APPENDIX D: List of computational goals

### COMPUTATIONAL GOALS OF MATH CURRICULUM (ADAPTED FROM SHAPIRO, 1989)

The computational skills listed below are arranged in ascending order of difficulty. Please identify (1) the skills which you have instructed in the classroom, (2) the skills that the student has mastered, and (3) the skills with which the student is currently having difficulty.

MASTERED : Place a check under the M column indicating the skills which the student has mastered.

INSTRUCTED : Place a check under the I column indicating the skills which you have instructed.

DIFFICULTY : Place a check under the D column indicating the skills with which the student is having difficulty.

M    I    D  
Grade 1

- |                          |                          |                          |  |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 1. Add two one-digit numbers: sums to 10.              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 2. Subtract two one-digit numbers: combinations to 10. |

Grade 2

- |                          |                          |                          |   |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 3. Add two one-digit numbers: sums 11 to 19.  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 4. Add a one-digit number to a two-digit number--no regrouping.                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 5. Add a two-digit number to a two-digit number--no regrouping.                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 6. Add a three-digit number to a three-digit number--no regrouping.                 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 7. Subtract a one-digit number from a one- or two-digit number: combinations to 18. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 8. Subtract a one-digit number from a two-digit number--no regrouping.              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 9. Subtract a two-digit number from a two-digit number--no regrouping.              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 10. Subtract a three-digit number from a three-digit number--no regrouping.         |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 11. Multiplication facts--0's, 1's, 2's.  |

Grade 3

- |                          |                          |                          |  |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 12. Add three or more one-digit numbers.   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 13. Add three or more two-digit numbers--no regrouping.  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 14. Add three or more three- and four-digit numbers--no regrouping.  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 15. Add a one-digit number to a two-digit number with regrouping.  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 16. Add a two-digit number to a two-digit number with regrouping.  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 17. Add a two-digit number to a three-digit number with regrouping from the units to the tens column only.                                     |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 18. Add a two-digit number to a three-digit number with regrouping from the tens to the hundreds column only.                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 19. Add a two-digit number to a three-digit number with regrouping from the units to the tens column and from the tens to the hundreds column. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 20. Add a three-digit number to a three-digit number with regrouping from the units to the tens column only.                                   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | 21. Add a three-digit number to a three-digit number with regrouping from the tens to the hundreds column only.                                |

## Appendix D: Computational Goals

M   I   D

- \_\_\_ \_\_\_ \_\_\_ 22. Add a three-digit number to a three-digit number with regrouping from the units to the tens column and from the tens to the hundreds column.
- \_\_\_ \_\_\_ \_\_\_ 23. Add a four-digit number to a four-digit number with regrouping in one to three columns.
- \_\_\_ \_\_\_ \_\_\_ 24. Subtract two four-digit numbers-no regrouping.
- \_\_\_ \_\_\_ \_\_\_ 25. Subtract a one-digit number from a two-digit number with regrouping.
- \_\_\_ \_\_\_ \_\_\_ 26. Subtract a two-digit number from a two-digit number with regrouping.
- \_\_\_ \_\_\_ \_\_\_ 27. Subtract a two-digit number from a three-digit number with regrouping from the units to the tens column only.
- \_\_\_ \_\_\_ \_\_\_ 28. Subtract a two-digit number from a three-digit number with regrouping from the tens to the hundreds column only.
- \_\_\_ \_\_\_ \_\_\_ 29. Subtract a two-digit number from a three-digit number with regrouping from the units to the tens column and from the tens to the hundreds column.
- \_\_\_ \_\_\_ \_\_\_ 30. Subtract a three-digit from a three-digit number with regrouping from the units to the tens column only.
- \_\_\_ \_\_\_ \_\_\_ 31. Subtract a three-digit number from a three-digit number with regrouping from the tens to the hundreds column only.
- \_\_\_ \_\_\_ \_\_\_ 32. Subtract a three-digit number from a three-digit number with regrouping from the units to the tens column and from the tens to the hundreds column.
- \_\_\_ \_\_\_ \_\_\_ 33. Multiplication facts--3 to 9.

### Grade 4

- \_\_\_ \_\_\_ \_\_\_ 34. Add a five- or six-digit number to a five- or six-digit number with regrouping in any columns.
- \_\_\_ \_\_\_ \_\_\_ 35. Add three or more two-digit numbers with regrouping.
- \_\_\_ \_\_\_ \_\_\_ 36. Add three or more three-digit numbers with regrouping with regrouping in any columns.
- \_\_\_ \_\_\_ \_\_\_ 37. Subtract a five- or six-digit number from a five- or six-digit number with regrouping in any columns.
- \_\_\_ \_\_\_ \_\_\_ 38. Multiply a two-digit number by a one-digit number with no regrouping.
- \_\_\_ \_\_\_ \_\_\_ 39. Multiply a three-digit number by a one-digit number with no regrouping.
- \_\_\_ \_\_\_ \_\_\_ 40. Multiply a two-digit number by a one-digit number with no regrouping.
- \_\_\_ \_\_\_ \_\_\_ 41. Multiply a three-digit number by a one-digit number with regrouping.
- \_\_\_ \_\_\_ \_\_\_ 42. Division facts--0 to 9.
- \_\_\_ \_\_\_ \_\_\_ 43. Divide a two-digit number by a one-digit number with no remainder.
- \_\_\_ \_\_\_ \_\_\_ 44. Divide a two-digit number by a one-digit number with remainder.
- \_\_\_ \_\_\_ \_\_\_ 45. Divide a three-digit number by a one digit number with remainder.
- \_\_\_ \_\_\_ \_\_\_ 46. Divide a four-digit number by a one-digit number with remainder.

## Appendix D: Computational Goals

M I D Grade 5

- — — 47. Multiply a two-digit number by a two-digit number with regrouping.  
— — — 48. Multiply a three-digit number by a two-digit number with regrouping.  
— — — 49. Multiply a three-digit number by a three-digit number with regrouping.

List of computational goals taken from Shapiro, Edward S. (1989). Academic skills problems: Direct assessment and intervention. New York: Guilford Press.

Curriculum-Based Assessment Mathematics  
Multiple-Skills Computation Probe: Student Copy

Student: Pupil Appraisal  
Personnel Summer Institute

Date: \_\_\_\_\_

$$\begin{array}{r} 663 \\ + 208 \\ + 628 \\ + \underline{411} \end{array}$$

$$\begin{array}{r} \underline{\hspace{1cm}} \\ 23/4439 \end{array}$$

$$\begin{array}{r} 2213 \\ \underline{\times 12} \end{array}$$

---

$$\begin{array}{r} 36,841 \\ -\underline{15,765} \end{array}$$

$$\begin{array}{r} 290 \\ + 731 \\ + \underline{672} \end{array}$$

$$\begin{array}{r} \underline{\hspace{1cm}} \\ 68/1496 \end{array}$$

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[www.interventioncentral.org](http://www.interventioncentral.org)

## Curriculum-Based Assessment Mathematics Multiple-Skills Computation Probe: Examiner Copy

Item 1:  
4 CD/4 CD Total  
*ADDITION: Three to five 3-digit numbers: Regrouping in any column*

$$\begin{array}{r} 663 \\ +208 \\ +628 \\ +\underline{411} \\ \hline 1910 \end{array}$$

Item 2:  
16 CD/20 CD Total  
*DIVISION: 4-digit number divided by 2-digit number: no remainder*

$$\begin{array}{r} \underline{193} \\ 23 \overline{)4439} \\ \underline{-23} \phantom{0} \\ 213 \\ \underline{-207} \\ 69 \\ \underline{-69} \\ 0 \end{array}$$

Item 3:  
14 CD/34 CD Total  
*MULTIPLICATION: 4-digit number times 2-digit number: no regrouping*

$$\begin{array}{r} 2213 \\ \times \underline{12} \\ \hline 4426 \\ \underline{2213-} \\ 26,556 \end{array}$$

Item 4:  
5 CD/39 CD Total  
*SUBTRACTION: 5-digit number from a 5-digit number: regrouping from 1's & 10's columns*

$$\begin{array}{r} 36,841 \\ - \underline{15,765} \\ \hline 21,076 \end{array}$$

Item 5:  
4 CD/43 CD Total  
*ADDITION: Three to five 3-digit numbers: Regrouping in any column*

$$\begin{array}{r} 290 \\ +731 \\ +\underline{672} \\ \hline 1693 \end{array}$$

Item 6:  
12 CD/55 CD Total  
*DIVISION: 4-digit number divided by 2-digit number: no remainder*

$$\begin{array}{r} \underline{22} \\ 68 \overline{)1496} \\ \underline{-136} \phantom{0} \\ 136 \\ \underline{-136} \\ 0 \end{array}$$

# Curriculum-Based Assessment Progress-Monitoring Data Recording Sheet

## Math Computation

Student Name: \_\_\_\_\_ Grade/Classroom: \_\_\_\_\_

- Single-Skill Worksheet
- Multiple-Skill Worksheet

Computation Skill(s) Assessed: \_\_\_\_\_

*Notes/Comments*

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

Date: \_\_\_\_\_ TD: \_\_\_\_\_ E: \_\_\_\_\_ CD: \_\_\_\_\_ %CD: \_\_\_\_\_

TRW= Total Digits    E=Errors    CD=Correct Digits    %CD=Percent Accuracy (CD/TD)



### Administration of CBM writing probes

The examiner distributes copies of CBM writing probes to all the students in the group. (Note: These probes may also be administered individually). The examiner says to the students:

*I want you to write a story. I am going to read a sentence to you first, and then I want you to write a short story about what happens. You will have 1 minute to think about the story you will write and then have 3 minutes to write it. Do your best work. If you don't know how to spell a word, you should guess. Are there any questions?*

*For the next minute, think about . . . [insert story-starter]. The examiner starts the stopwatch.*

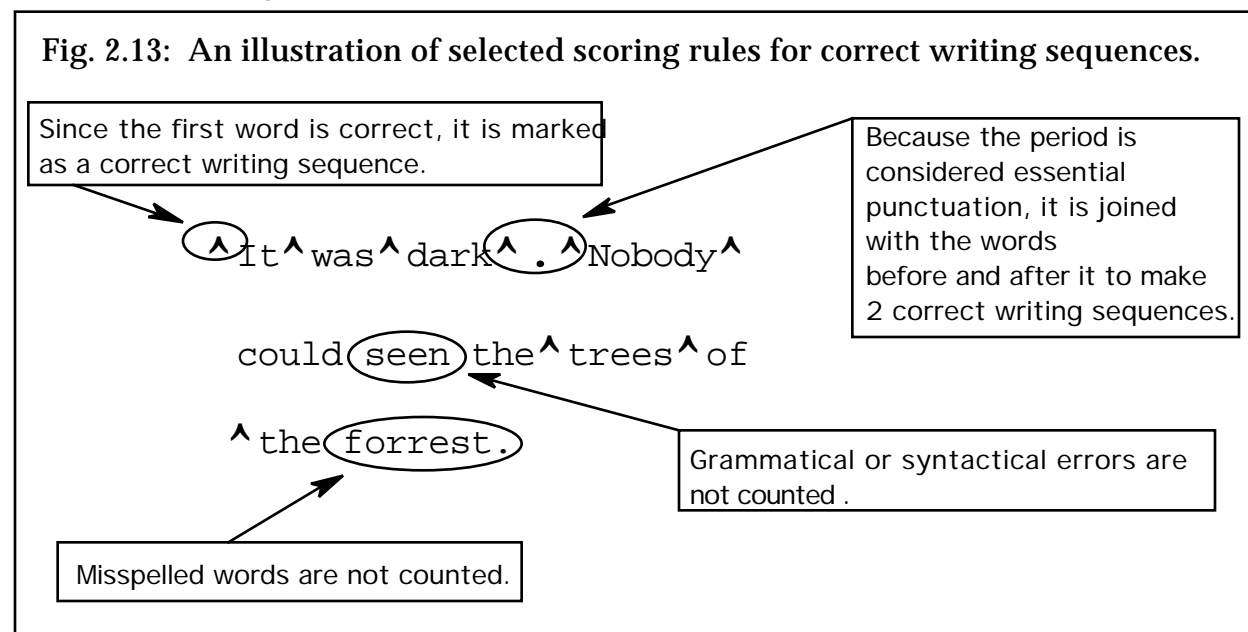
At the end of 1 minute, the examiner says, *Start writing.*

While the students are writing, the examiner and any other adults helping in the assessment circulate around the room. If students stop writing before the 3-minute timing period has ended, monitors encourage them to continue writing.

After 3 additional minutes, the examiner says, *Stop writing.* CBM writing probes are collected for scoring.

### Scoring

#### 4. Correct Writing Sequences--



The following scoring rules will aid the instructor in determining correct writing sequences:

- ➔ Correctly spelled words make up a correct writing sequence (reversed letters are acceptable, so long as they do not lead to a misspelling):

Example  
^ Is ^ that ^ a ^ red ^ car ^ ?

- ➔ Necessary marks of punctuation (excluding commas) are included in correct writing sequences:

Example  
^ Is ^ that ^ a ^ red ^ car ^ ?

- ➔ Syntactically correct words make up a correct writing sequence:

Example  
^ Is ^ that ^ a ^ red ^ car ^ ?  
^ Is ^ that ^ a ^ car red ?

- ➔ Semantically correct words make up a correct writing sequence:

Example  
^ Is ^ that ^ a ^ red ^ car ^ ?  
^ Is ^ that ^ a read car ^ ?

- ➔ If correct, the initial word of a writing sample is counted as a correct writing sequence:

Example  
^ Is ^ that ^ a ^ red ^ car ^ ?

- ➔ Titles are included in the correct writing sequence count:

Example

^The^Terrible^Day

- ➔ With the exception of dates, numbers written in numeral form are not included in the correct writing sequence count:

Example

^The^14^soldiers^waited^in^the^cold^.

^The^crash^occurred^in^1976^.

# CBA Writing Probe

Name \_\_\_\_\_ Grade/Classroom \_\_\_\_\_ Date \_\_\_\_\_

One day I went out on a boat into the open ocean. I was all alone in the boat. Suddenly a storm blew in and carried me off to a desert island. Then...

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[Total Wds\_\_\_\_] [# Correctly Spelled Wds \_\_\_\_] [#Correct Writing Sequences\_\_\_\_]

Curriculum-Based Assessment Progress-Monitoring Data Recording Sheet

# Writing/Total Writing Sequences:

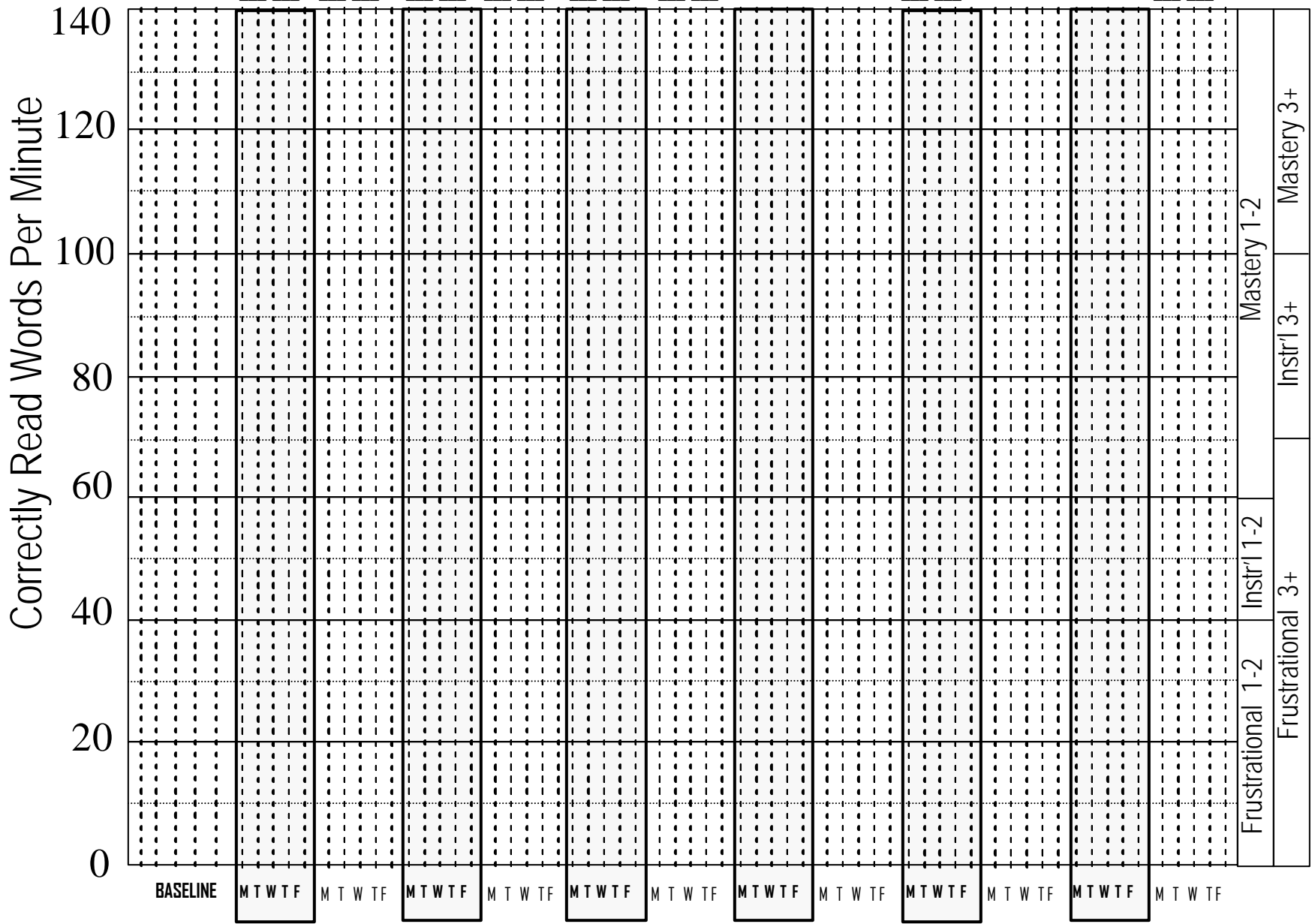
Student Name: \_\_\_\_\_ Grade/Classroom: \_\_\_\_\_

					<i>Notes/Comments</i>
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	
Date: _____	TWS: _____	E: _____	CWS: _____	%CWS: _____	

TWS= Total Writing Sequences    E=Errors    CWS=Correct Writing Sequences    %CWS=Percent Accuracy (CWS/TWS)

Student: \_\_\_\_\_ Classrm/Grade: \_\_\_\_\_ Monitoring Level: \_\_\_\_\_

BASELINE WEEK 1 WEEK 2 WEEK 3 WEEK 4 WEEK 5 WEEK 6 WEEK 7 WEEK 8 WEEK 9 WEEK 10 WEEK 11 WEEK 12

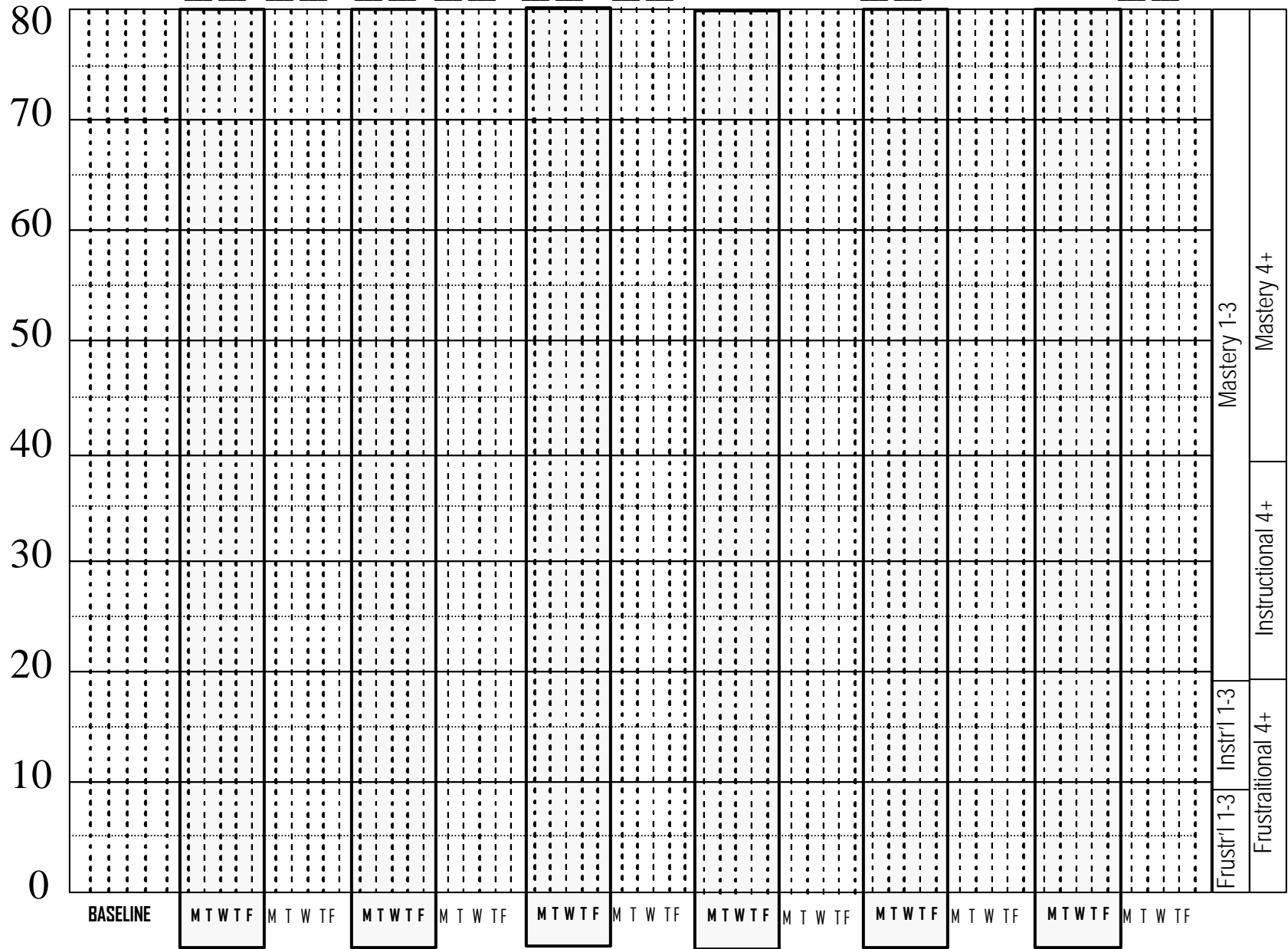


(Norms from Shapiro, 1996)

Student: \_\_\_\_\_ Classrm/Grade: \_\_\_\_\_ Monitoring Level: \_\_\_\_\_

BASELINE WEEK 1 WEEK 2 WEEK 3 WEEK 4 WEEK 5 WEEK 6 WEEK 7 WEEK 8 WEEK 9 WEEK 10 WEEK 11 WEEK 12

Correct Digits Per 2 Minutes: Problem Type(s): \_\_\_\_\_



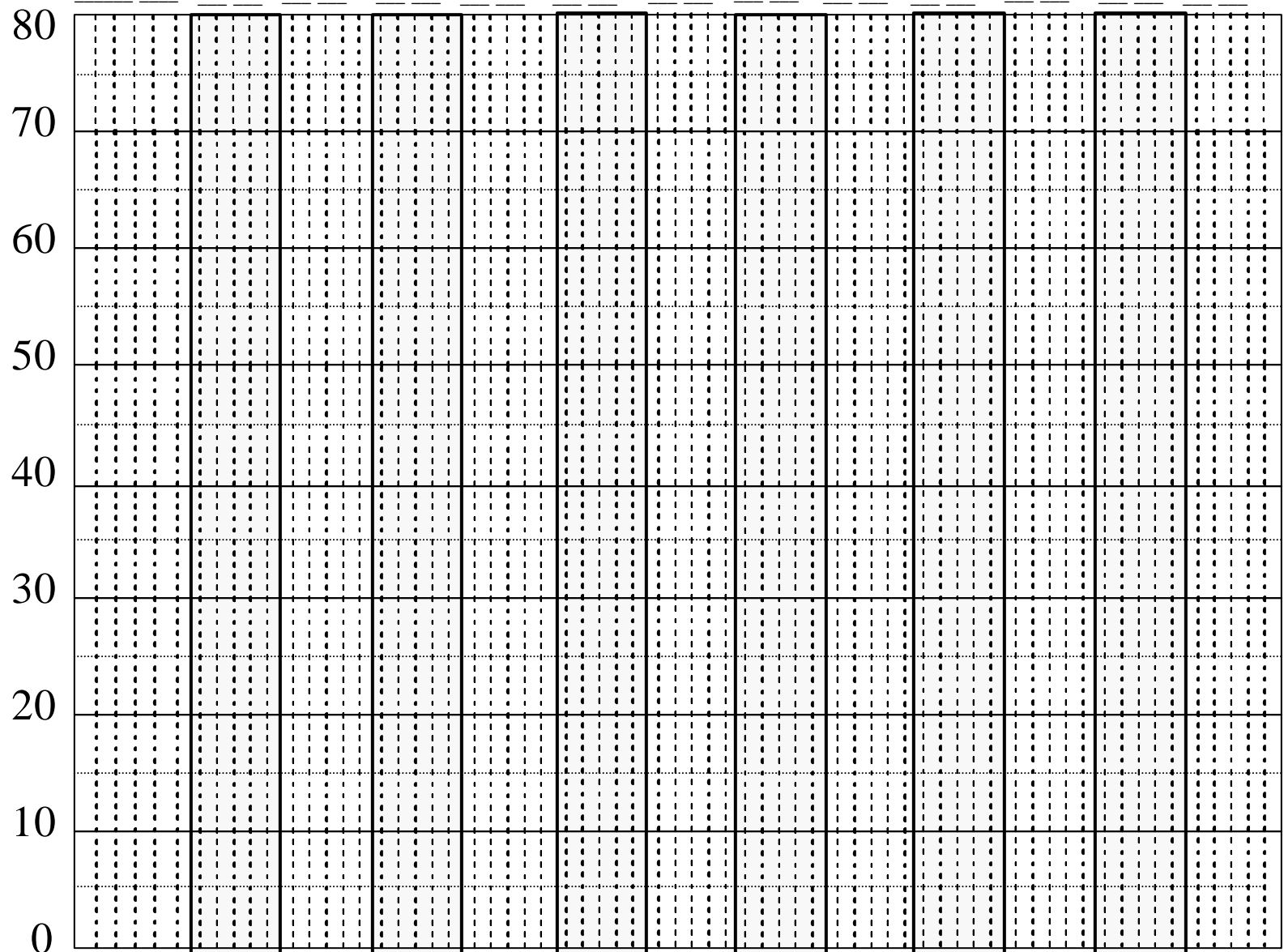
Frust'r'l 1-3    Instr'l 1-3    Mastery 1-3  
Frust'r'l 4+    Instr'l 4+    Mastery 4+

(Norms from Shapiro, 1996)

Student: \_\_\_\_\_ Classrm/Grade: \_\_\_\_\_ Monitoring Level: \_\_\_\_\_

Writing Sample Per 3 Minutes: \_\_\_\_\_ # Correct Writing Sequences \_\_\_\_\_ #Correct Punctuation \_\_\_\_\_  
 Total Words \_\_\_\_\_ #Correctly Spelled Words \_\_\_\_\_

BASELINE WEEK 1 WEEK 2 WEEK 3 WEEK 4 WEEK 5 WEEK 6 WEEK 7 WEEK 8 WEEK 9 WEEK 10 WEEK 11 WEEK 12



(Norms from Shapiro, 1996)

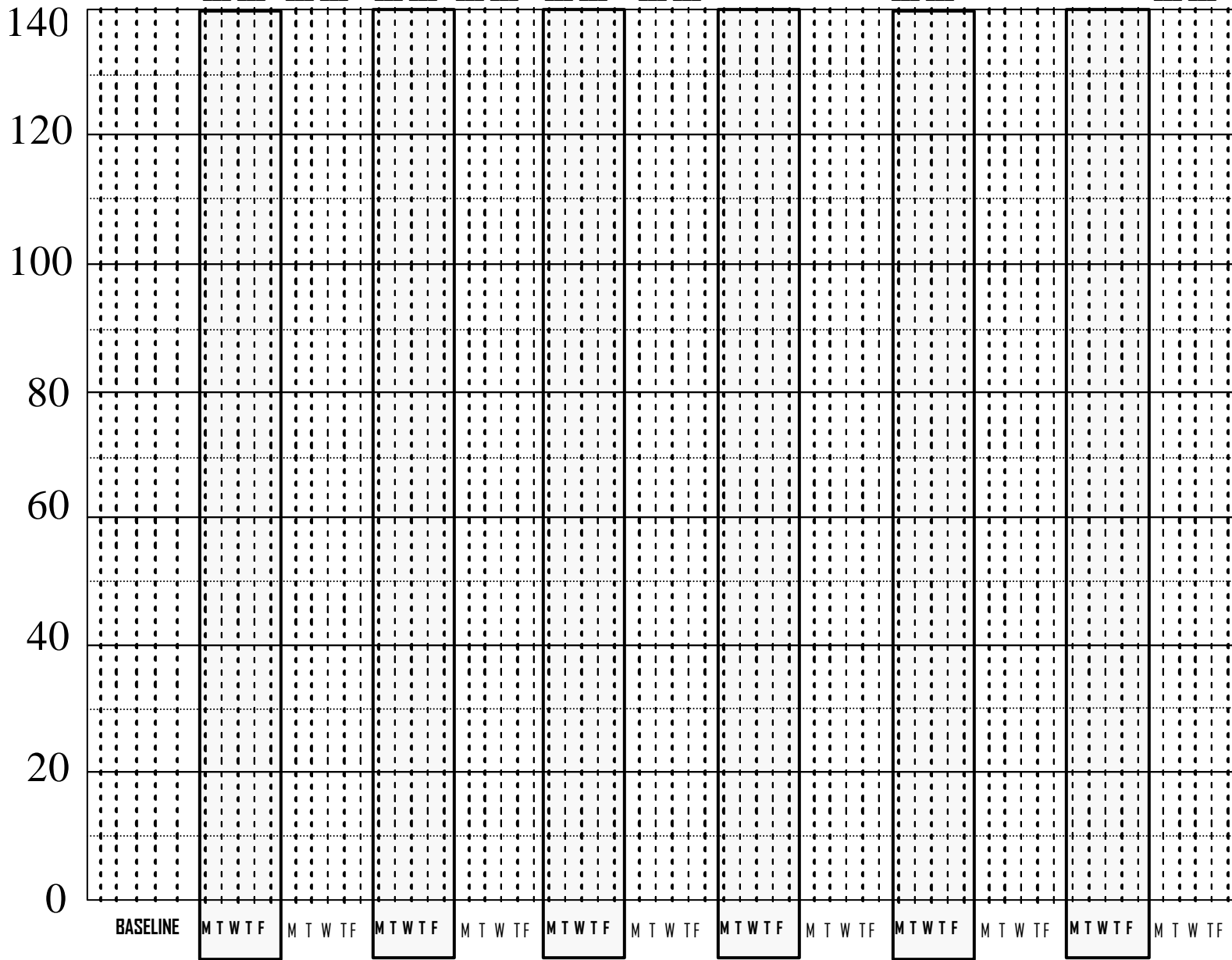
- Writing Norms  
(# Correct Spellings)
- 6<sup>th</sup> GR/53 Wds
- 5<sup>th</sup> GR/49 Wds
- 4<sup>th</sup> GR/41 Wds
- 3<sup>rd</sup> GR/37 Wds
- 2<sup>nd</sup> GR/28 Wds
- 1<sup>st</sup> GR/15 Wds



Student: \_\_\_\_\_ Classrm/Grade: \_\_\_\_\_ Monitoring Level: \_\_\_\_\_

BASELINE WEEK 1 WEEK 2 WEEK 3 WEEK 4 WEEK 5 WEEK 6 WEEK 7 WEEK 8 WEEK 9 WEEK 10 WEEK 11 WEEK 12

Behavior/Skill to Measure:



Instructional Days