Curriculum-Based Measurement: How to Track Basic Academic Skills

*Jim Wright www.interventioncentral.org* 





### Classroom Data Collection: Right Tools for the Job...

Student outcome measures are 'academic performance/student behavior' detectors. When possible, they should be:

- convenient for teachers to use
- valid and reliable measures of the academic performance/behavior being measured'
- sensitive to short-term student improvement

# 1. Curriculum-Based Measurement

• What It Is. Curriculum-based measurement (CBM) is a family of timed assessments to assess fluency in basic academic skills.

Examples include oral reading fluency (1-minute assessments of student reading from text), and math computation fluency (2-minute math-fact drills).

Curriculum-Based Measurement: Advantages as a Set of Tools to Monitor Basic Academic-Skill Fluency

- Aligns with curriculum-goals and materials
- Is reliable and valid (has 'technical adequacy')
- Is criterion-referenced: sets specific performance levels for specific tasks
- Uses standard procedures to prepare materials, administer, and score
- Samples student performance to give objective, observable 'lowinference' information about student performance
- Has decision rules to help educators to interpret student data and make appropriate instructional decisions
- Is efficient to implement in schools (e.g., training can be done quickly; the measures are brief and feasible for classrooms, etc.)
- Provides data that can be converted into visual displays for ease of communication

Source: Hosp, M.K., Hosp, J. L., & Howell, K. W. (2007). The ABCs of CBM. New York: Guilford.

#### Big Ideas: The Four Stages of Learning Can Be Summed Up in the 'Instructional Hierarchy' (Haring et al., 1978)

Student learning can be thought of as a multi-stage process. The universal stages of learning include:

- Acquisition: The student is just acquiring the skill.
- Fluency: The student can perform the skill but must make that skill 'automatic'.
- Generalization: The student must perform the skill across situations or settings.
- Adaptation: The student confronts novel task demands that require that the student adapt a current skill to meet new requirements.

The type of academic intervention selected should match a student's 'stage' of learning.



*Source:* Haring, N.G., Lovitt, T.C., Eaton, M.D., & Hansen, C.L. (1978). The fourth R: Research in the classroom. Columbus, OH: Charles E. Merrill Publishing Co.

Fluency Example: CBM Student Reading Samples: 1-Minute Oral Reading Fluency Probes: What Difference Does Fluency Make?

- 3<sup>rd</sup> Grade: 19 Words Per Minute
- 3<sup>rd</sup> Grade: 70 Words Per Minute
- 3<sup>rd</sup> Grade: 98 Words Per Minute



# 1. Curriculum-Based Measurement

• When to Use It. Curriculum-based measures are ideal tools when the teacher is interested in tracking a student's increase in basic-skill fluency (i.e., speed plus accuracy).

If a student is slow and halting when reading from text, for example, the instructor may monitor the student weekly using 1-minute oral reading fluency probes to ascertain whether that student is developing fluency as a reader.

# 1. Curriculum-Based Measurement

 How to assess and where to find materials. While CBM covers a wide range of different assessments, all are brief; timed; use standard procedures to prepare materials, administer, and score; and include decision rules to help educators to make appropriate instructional decisions (Hosp, Hosp & Howell, 2007).

There are both free and commercial sources for obtaining CBM materials.

#### Curriculum-Based Measures (CBMs)

CBM	Skill Area	Activity
Letter Sound Fluency/Letter Name Fluency	Alphabetics/ Phonics	1 Minute: Student reads letter names or sounds from a randomly generated list.
Oral Reading Fluency	Reading Fluency	1 Minute: Student reads aloud from a text passage.
Reading Comprehension Fluency (Maze)	Reading Comprehension	3 Minutes: Student reads silently from a Maze passage and selects correct word in each choice item that restores meaning to the passage.
Early Math Fluency	Number Sense	1 Minute: Student completes an Early Math Fluency probe: (1) Quantity Discrimination; (2) Missing Number; or (3) Number Identification
Computation Fluency	Math Fact Fluency	2 Minutes: Student <b>completes math facts</b> and receives credit for each <b>correct digit</b> .
Written Expression	Mechanics/ Conventions of Writing	4 Minutes: Student reads a story-starter (sentence stem), then produces a writing sample that can be scored for Total Words Written, Correctly Spelled Words, Correct Writing Sequences.

# Letter Knowledge

 The ability of young children to identify letter names and sounds quickly and accurately gives information about their phonics/alphabetics skills, which are necessary tools for reading.

#### Five Core Components of Reading

- "Phonemic Awareness: The ability to hear and manipulate sounds in words.
- Alphabetic Principle: The ability to associate sounds with letters and use these sounds to form words.
- Fluency with Text: The effortless, automatic ability to read words in connected text.
- Vocabulary: The ability to understand (receptive) and use (expressive) words to acquire and convey meaning.
- Comprehension: The complex cognitive process involving the intentional interaction between reader and text to convey meaning."

 Letter Knowledge: Letter Name Fluency (LNF) [1 minute]: The student is given a random list of upper- and lower-case letters and identifies the names of as many letters as possible.

Curriculum-Based Measurement: Letter Name Fluency (LNF) Norms (Riverside, 2013)\*

In the CBM-Letter Name Fluency (LNF) task, the student is given a random list of upper- and lower-case letters and has 1 minute to identify the names of as many letters as possible.

Grade	Percentile	Fall LNF (Riverside, 2013)	Winter LNF (Riverside, 2013)	Spring LNF (Riverside, 2013)	Weekly Growth (Calculated across 32 Instructional Wks)
	50%ile	19	35	45	0.81
K	20%ile	5	22	36	0.97
	10%ile	2	13	29	0.84
			I	I	
4	50%ile	40	56	68	0.88
	20%ile	28	42	49	0.66
•	10%ile	20	34	42	0.69

 Letter Knowledge: Letter Sound Fluency (LSF) [1 minute]: The student is given a random list of upper- and lower-case letters and identifies the sounds of as many letters as possible.

Curriculum-Based Measurement: Letter Sound Fluency (LSF) Norms (Riverside, 2013)\* In the CBM-Letter Sound Fluency (LSF) task, the student is given a random list of upper- and lower-case letters and has 1 minute to identify as many letter sounds as possible.

Grade	Percentile	Fall	Fall Winter Spring		Weekly Growth
		LSF	LSF	LSF	
		(Riverside, 2013)	(Riverside, 2013)	(Riverside, 2013)	
	50%ile	4	22	35	0.97
K	20%ile	1	9	23	0.69
	10%ile	0	5	16	0.50
1	50%ile	29	40	46	0.53
	20%ile	18	31	36	0.56
	10%ile	12	27	30	0.56

#### Letter Name/Sound Fluency Probe Generator http://www.interventioncentral.org

Use this free online application to design and create Letter Name and Letter Sound Fluency Probes.

#### Letter Naming Fluency Probe Generator

\* Indicates a required field

Alphabet
English 
Letter Case
Lowercase 
Font Family
Helvetica 
Font Size
14 
Total number of letters to appear in the probe\* (Max: 400)
100

Add letters as needed to fill out final line of probe
Name of this list (?)
Download PDF Email PDF

# Reading Speed: Oral Reading Fluency

• The speed and accuracy of a child reading aloud is correlated with increased comprehension and overall reading skill.

#### Five Core Components of Reading

- "Phonemic Awareness: The ability to hear and manipulate sounds in words.
- Alphabetic Principle: The ability to associate sounds with letters and use these sounds to form words.
- Fluency with Text: The effortless, automatic ability to read words in connected text.
- Vocabulary: The ability to understand (receptive) and use (expressive) words to acquire and convey meaning.
- Comprehension: The complex cognitive process involving the intentional interaction between reader and text to convey meaning."

National Reading Panel Report (2000): Conclusions Regarding Importance of Oral Reading Fluency:

"An extensive review of the literature indicates that classroom practices that encourage repeated oral reading with feedback and guidance leads to meaningful improvements in reading expertise for students—for good readers as well as those who are experiencing difficulties."-p. 3-3

Oral Reading Fluency [1 Minute]. The student reads aloud from a passage, with the reading sample scored for words read correctly (WRC) and Curriculum-Based Measurement: Oral Reading Fluency Norms (Hasbrouck & Tindal, 2005)\*
 CBM-Oral Reading Fluency assesses general reading performance (Espin et al., 2010), as well as reading speed.

CBM-Oral Reading Fluency assesses general reading performance (Espin et al., 2010), as well as reading speed. In an oral reading fluency assessment, the student reads aloud from a passage for 1 minute. The reading sample is scored for words read correctly (WRC) and errors.

Grade	Percentile	Fall Oral Reading Fluency (Hasbrouck & Tindal, 2005)	WinterSpringOral ReadingOral ReadingFluencyFluency(Hasbrouck & Tindal, 2005)2005)		Weekly Growth (Hasbrouck & Tindal, 2005)
	50%ile		23	53	1.9
1	25%ile		12	28	1.0
	10%ile		6	15	0.6
	E00/31-	54	70	00	4.0
0	50%lle	51	12	89	1.2
	25%ile	25	42	61	1.1
	10%ile	11	18	31	0.6
	50%ile	71	02	107	11
l 2	007611e	11	02	70	1.1
J	25%lle	44	62	/8	1.1
	10%ile	21	36	48	0.8
	<b>500/ i</b> le	04	440	400	0.0
Λ	50%ile	94	112	123	0.9
4	25%ile	68	87	98	0.9
	10%ile	45	61	72	0.8

Oral Reading Fluency [1 Minute]. The student reads aloud from a passage, with the reading sample scored for words read correctly (WRC) and Curriculum-Based Measurement: Oral Reading Fluency Norms (Hasbrouck & Tindal, 2005)\*
 CBM-Oral Reading Fluency assesses general reading performance (Espin et al., 2010), as well as reading speed.

CBM-Oral Reading Fluency assesses general reading performance (Espin et al., 2010), as well as reading speed. In an oral reading fluency assessment, the student reads aloud from a passage for 1 minute. The reading sample is scored for words read correctly (WRC) and errors.

Grade	Percentile	Fall Oral Reading Fluency (Hasbrouck & Tindal, 2005)	Winter Oral Reading Fluency (Hasbrouck & Tindal, 2005)	Spring Oral Reading Fluency (Hasbrouck & Tindal, 2005)	Weekly Growth (Hasbrouck & Tindal, 2005)	
5	50%ile	110	127	139	0.9	
0	10%ile	61	74	83	0.8	
<u>^</u>	50%ile	127	140	150	0.7	
6	25%ile	98	111	122	0.8	
	10%ile	68	82	93	0.8	
7	50%ile	128	136	150	0.7	
	25%ile	102	109	123	0.7	
-	10%ile	79	88	98	0.6	
0	50%ile	133	146	151	0.6	
B	25%ile	106	115	124	0.6	
Ť	10%ile	77	84	97	0.6	

Curriculum-Based Measurement: Oral Reading Fluency Passage: Examiner Copy

Assessment Date: / / Student: Examiner:

Words Read Correctly (WRC): \_\_\_\_ Errors: \_\_\_\_ Notes: \_\_\_\_

Jellyfish Are Efficient Predators

#### New York Times

#### CBM-Sample Oral Reading Fluency Passage

For animals that drift through the sea without the benefit of eyesight, jellyfish13have managed to survive remarkably well. In fact, in areas where overfishing25and habitat destruction have reduced fish populations, jellyfish are now35becoming the dominant predators.39

It turns out that jellyfish, despite their sluggish looks, are just as effective at53hunting and catching meals as their competitors with fins. They may not move66as quickly, but in a study published in the journal Science, researchers found79that many jellyfish use their body size to increase their hunting success. With92their large, watery bodies and long tentacles, they conserve energy by letting104currents guide them into their prey, said José Luis Acuña, an author of the118paper and a biologist at the University of Oviedo in Spain.129

"To our surprise, jellyfish were as good predators as visually predating fish in142spite of being slow and blind, because they play an entirely different154hydromechanical trick," he said in an e-mail.163

Online Resources: Oral Reading Fluency

• Free ORF passages and national norms for grades 1-6 are available fat:

DIBELS NEXT: https://dibels.org/next/

• EasyCBM: http://www.easycbm.com

NOTE: Users create a free account to download and print ORF passages.

Reading Fluency Passages Generator

Enter a user-selected passage to format as an Oral Reading Fluency Probe for reading fluency assessment.

Star Reading Fluency Fassage Scherator
Please fill out the fields below and click on Download or Email PDF to generate an Oral Readin
Title (?)
Author (?)
Font (?) Text Size (?)
Passage
. ti
Word Count: 0 (Min: 1 Max: 900)
Show sentence boundaries (?)
Treat semi-colons(;) and colons(:) as sentence boundaries (?)
Remove all line breaks to create a single-paragraph passage
Readability Estimate Formulas (?) Compute
(A minimum of 75 words is needed to reliably estimate readability.)
Formula
FORCAST (?)
Spache (?)

URL: http://www.interventioncentral.org/teacher-resources/oral-reading-fluency-passages-generator

**Response to Interventio** 

Oral Deading Eluency Passage Cenerator

# Reading Comprehension: Maze

• Efficient student understanding of text is a culminating skill in reading and the foundation for academic success in the secondary grades.

#### Five Core Components of Reading

- "Phonemic Awareness: The ability to hear and manipulate sounds in words.
- Alphabetic Principle: The ability to associate sounds with letters and use these sounds to form words.
- Fluency with Text: The effortless, automatic ability to read words in connected text.
- Vocabulary: The ability to understand (receptive) and use (expressive) words to acquire and convey meaning.
- Comprehension: The complex cognitive process involving the intentional interaction between reader and text to convey meaning."

 Maze Passage [3 Minutes]. The student silently reads a specially formatted passage with multiple-response format appearing on every 7th word and—for each item-- circles the word that 'restores' the meaning of that section of the passage..

> Curriculum-Based Measurement: Maze Passage Fluency Norms (Fuchs, Fuchs, Hamlett, Waltz, & Germann, 1993; Graney, Missall, Martinez, & Bergstrom, 2009; Jenkins & Jewell, 1993)\*

Grade	Fall Maze (Jenkins & Jewell, 1993)	Fall:+/-1 SD (≈16th%ile to 84th%ile)	Spring Maze (Jenkins & Jewell, 1993)	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth (Fuchs et al., 1993)
2	6	1↔11	15	7↔23	0.40

Grade	Fall Maze (Graney et al., 2009)	Fall:+/-1 SD (≈16th%ile to 84th%ile)	Winter Maze (Graney et al., 2009)	Winter: +/-1 SD (≈16th%ile to 84th%ile)	Spring Maze (Graney et al., 2009)	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth (Fuchs et al., 1993)
3	13	7↔19	14	8↔20	15	9↔21	0.40
4	14	9↔19	21	12↔30	20	12↔28	0.40
5	18	11↔25	22	14↔30	26	18↔34	0.40

Grade	Fall Maze (Jenkins & Jewell, 1993)	Fall:+/-1 SD (≈16th%ile to 84th%ile)	Spring Maze (Jenkins & Jewell, 1993)	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth (Fuchs et al., 1993)
6	33	22↔44	39	26↔52	0.40

(Remember, Poised, It) turns out that jellyfish, despite their (improve, sluggish, amount) looks, are just as effective at (thought, hunting, comfort) and catching meals as their competitors (beside, with, destruction) fins. They may not move as (quickly, cough, flight), but in a study published in (the, damaged, dirty) journal Science, researchers found that many

#### dominant predate

#### CBM-Sample Maze Passage

(Remember, Poised, It) turns out in a comfort) and catching meals as their competitors (beside, with, destruction) fins. They may not move as (quickly, cough, flight), but in a study published in (the, damaged, dirty) journal Science, researchers found that many (jellyfish, known, proud) use their body size to increase (fresh, their, servant) hunting success. With their large, watery (accept, jelly, bodies) and long tentacles, they conserve energy (by, teach, correctly) letting currents guide them into their (agree, proud, prey), said José Luis Acuña, an author (of, daughter, mountain) the paper and a biologist at (intend, equally, the) University of Oviedo in Spain.

"To (our, via, insect) surprise, jellyfish were as good predators (blindly, as, on) visually predating fish in spite of (being, bewildered, thought) slow and blind, because they play (an, place, driven) entirely different hydromechanical trick," he said (uptight, in, following) an e-mail.

# Online Resources: Maze

• Free Maze passages and national norms for grades 3-6 are available from DIBELS NEXT at:

https://dibels.org/next/

NOTE: Users create a free account to download and print Maze passages (called 'DAZE' by DIBELS).

Maze Passage Generator

Enter a user-selected passage to format as a Maze passage for reading comprehension assessment.

ome	Academic Interventi	ions Behavior Interventions	Products	Workshops	CEM	Downloads	RTI Help	Conta
Maze	e Passage		or comments at	bout this tool, gives	e mei me	Muke 🖌 🖌	weet () Pir	
	Complete Solution Increase Reading Free Math Worksh Free Teacher Reso	for RTI Benchmark and Targeted As Fluanoy Spend Less Time Testing M adds Printable Math Worksheets Sort purpas Get lesson plans, worksheets	sessments Oni ore Time Teach ed by Grade! M & Collaborate v	ine or Paper, Dist Ing - Sae How <u>ww</u> ake Learning Mat with English teach	rictwide <u>w</u> wLexisLean h Engagin Ers <u>Teachin</u>	w bluerbbornestin ring.com Q. <u>ww Education</u> gChannel.org Ac	<u>aon</u> Choices (>	
Maz	ze Passage G	enerator						
		Previous		iext 🔰				
Step	1 of 3							
substit. a timed word fr	uted in the passage in pla d Maze administration, the rom the three choices that	scenes into a response tem that con sce of the original, correct word). The e reader silently reads the Maze pass t best restores the meaning of that se	sists of the origi se three choice age; whenever gment of the pr	inal word plus two s are randomly ar the or she encour sssage. The read	foils (wo ranged ar iters a res er continu	rds that would r nd inserted bac sponse item, th ies until time ex	not make sense k into the text. I e reader circles t pires. A good	if During the
substitu a fimed word fin descrip 2007). Directi	uted in the passage in pla d Maze administration, th om the three choices tha tion of Maze passages a jons: This Maze Passace	portation into a response nerr that con- sec of the original, correct word). The e reader allently reads the Maze pass t best restores the meaning of that as and administration can be found in the e Generator largely submates the w	sists of the orig se three choice age; whenever gment of the pr manual <u>Using</u> ork of creating s	inal word plus two s are randomly ar he or she encour sssage. The read CBM for Progress a Maze passage y	ofoils (wo ranged ar ters a res er continu s-Monitori	rds that would r nd inserted bac sponse item, th es until time ex ng in Reading ( entered content	not make sense k into the text. ( e reader circles i pires. A good Fuchs & Fuchs,	if During the
substitu a timed word fn descrip 2007). Directi To get Title of	uted in the passage in pla d Maze administration, th orm the three choices the oftion of Maze passages a ions: This Maze Passage started, type or paste the the passage. NOTE: To	sorated into a response nerr that con- sec of the original, correct word). The e reader silently reads the Maze pass t best restores the meaning of that as ind administration can be found in the e. Generator largely automates the wi- compute readability, click on the COI compute readability, click on the COI	sists of the orig se three choice age; whenever gment of the p menual <u>Using</u> ork of creating a set in the Passa JPUTE button I	inal word plus two s are randomly ar the or she encour sssage. The read <u>CBM for Progress</u> a Maze passage v sge box below. Yo below under 'Rea	i foils (woi ranged ar ters a reser continu <u>s-Monitori</u> with user-re u can also dability Es	ids that would r nd inserted bac sponse item, the es until time es and in Reading ( entered content o optionally typ stimates'.	not make sense k into the text. I e reader ciccles pires: A good Fuchs & Fuchs, Fuchs & Fuchs, t e in the Author a	if During the and/or
substit. a fimed word fin descrip 2007). Directi To get Title of Selecti	uted in the passage in pla d Maze administration, the com the three choices the strinn of Maze passages a ions: This Maze Passage started, type or paste the the passage. NOTE: To ing Foils for the Maze Pas	solated into a response nem that con set of the original, correct word). The e reader alently reads the Maze pass t best restores the meaning of that se and administration can be found in the e Generator largely subomates the wi e passage that you would like to conv compute readability, click on the COI stage. The application allows you the	sists of the orig se three choice gge; whenever gment of the pr manual <u>Using</u> ork of creating a set in the Passa APUTE button I se choices in se	inal word plus two s are randomly at he or she encour sasage. The read <u>CBU for Progress</u> a Maze passage v age bax below. Yo below under Rea electing foils to be	rols (woi ranged ar ters a res er continu s-Monitori with user-re u can als debility E: included	ids that would n d inserted bac sponse item, this es until time es ng in Reading ( entered content o optionally typ timates'. in the Maze re:	not make sense k into the text. pines. A good Fuchs & Fuchs, L e in the Author e aponses:	f During the andior
substit. a timed word fn descrip 2007). Directi To get Title of Selecti 1.	uted in the passage in pla d Maze administration, the orm the three choices the otion of Maze passages a ions: This Maze Passage started, type or paste the the passage. NOTE: To ing Foils for the Maze Par Basic list of common E not select another choice	solated into a response nem that con set of the original, correct word). The e reader alently reads the Maze pass t best restores the meaning of that se ind administration can be found in the e Generator largely automates the wi e passage that you would like to conv compute readsbilly, click on the COI asage. The application allows you the inglish words. The application select b.	sists of the onig set three choice age; whenever gment of the p menual <u>Using</u> ork of creating s art in the Passa JPUTE button I se choices in se s foils from a lit	inal word plus two s are randomly at he or she encour sasage. The read <u>CBU for Progress</u> a Maze passage v age box below. Yo below under 'Rea electing foils to be at of common wor	rolls (woi ranged ar tens a res er continu <u>s-Monitori</u> with user-re u can als debility Es included ds; this is	rids that would in nd inserted back ponse item, the until time ex- ng in Reading i entered content o optionally typ timates'. in the Maze re: the default out	not make sense k into the text. e resder circles: pires: A good Fuchs & Fuchs, e in the Author e aponses: come if the user	if During the andior
substit. a timed word fin descrip 2007). Directi To get Title of Selecti 1. 1 2.	uted in the passage in pla d Maze administration, the orm the three choices the otion of Maze passages a ions: This Maze Passage started, type or paste the "the passage. NOTE: To ing Foils for the Maze Par Basic list of common E not select another choice Words selected randon choice for more technica	solated into a response nem that con acc of the original, correct word). The e reader alently reads the Maze pass t best restores the meaning of that as ind administration can be found in the e Generator largely automates the wi e passage that you would like to conv compute readsbilly, click on the COI asage. The application allows you the inglish words. The application select b.	sists of the onig set three choice age; whenever gment of the p menual <u>Using</u> ork of creating s art in the Passa JPUTE button I se choices in se a foils from a lite ion uses words nt with the over	inal word plus two s are randomly at the or she encours sasage. The read <u>CBU for Progress</u> a Maze passage v age box below. Yo below under 'Rea electing foils to be at of common work randomly pulled 'all passage conte	rolls (woi ranged ar ters a reservention s-Monitori s-M	rids that would a nd inserted back ponse item, th les until time ex and in Reading i entered content o optionally typ timates'. in the Maze re: the default out passage as foi	not make sense k into the text. e resder circles pires: A good Fuchs & Fuchs, e in the Author e aponses: come if the user la. This can be a	if During the and/or rdoes
substitu a timed word fin descrip 2007). Directi To get Title of Selecti 1. 1	uted in the passage in pla 4 Maze administration, the commendation of Maze passages a minors: This Maze Passages started, type or paste the the passage. NOTE: To ing Foils for the Maze Pas- Basic list of common E not select another choice Words selected randon choice for more technical Your own word list. You	sorated into a response nem that con- sec of the original, correct word). The e reader silently reads the Maze pass t best restores the meaning of that as ind administration can be found in the e Generator largely automates the wi e passage that you would like to convo- compute readability, click on the COI asage. The application allows you the inglish words. The application select nly from your passage. The application litext, to ensure that foils are consiste u can enter a word list of your own the	sists of the onig set three choice age; whenever gment of the p manual <u>Using</u> ork of creating a set in the Passa PUTE button I are choices in set a foils from a lis- tion uses words int with the over at the application	ind word plus two s are randomly at a ser randomly at sasage. The read <u>CBM for Progress</u> a Maze passage v rege box below. Yo below under 'Rea electing foils to be at of common wor- randomly pulled and passage conta- in will use in select	Foils (woi renged at there a reservention s-Monitori s-Monitori u can also dability Es included da; this is from your st. ting item 1	rids that would r nd inserted back ponse item, th es until time es ing in Reading / antered content o optionally typ timates'. in the Maze re: the default out passage as foi foils for the Max	not make sense k into the text. e resder circles pires: A good Fuchs & Fuchs, e in the Author e aponses: come if the user is. This can be e ze passage.	if During the and/or adoes a good
substiti a timed wood fr descrip 2007). Directi To get Title of Selecti 1. 1 2. 1 3. 3 When y	uted in the passage in pla 1 Maze administration, th om the three choices the otion of Maze passages a ions: This Maze Passage started, type or paste the 'the passage. NOTE: To ing Foils for the Maze Pas- mage Foils for the Maze Pas- Basic list of common E not select another choice Words selected random choice for more technical Your own word list. You you are ready to go to the	sonated into a response nem that con see of the original, correct word). The e reader alently reads the Maze pass t best restores the meaning of that se and administration can be found in the e Generator largely automates the wi e passage that you would like to conv compute readability, click on the COI assage. The application select be inglish words. The application select be inglish words. The application select be and from your passage. The application lists, to ensure that foils are consiste u can enter a word list of your own the e next screen, click the NEXT button.	sists of the onig set three choice age; whenever gment of the p menual <u>Using</u> ork of creating s art in the Passa JPUTE button I se choices in se a foils from a lit ion uses words nt with the over the applicatio	inal word plus two is are randomly at a ser randomly and cBU for Progress a Maze passage v as Maze passage v as base below. Yo below under Rea electing foils to be at of common wor- randomly pulled all passage conte in will use in select	foils (woi ranged at thers a rest er continu Monitori with user-re u can also dability Es included da; this is from your ent. ting item !	rids that would a nd inserted back ponse item, th es until time ex and in Reading i entered content o optionally typ timates'. In the Maze re: the default out passage as foi foils for the Max	not make sense k into the text. e resder circles pires. A good Fuchs & Fuchs, e in the Author e aponses: come if the user la. This can be s ze passage.	if During the andior does
substit s timed word fr descrip 2007). Directi To get Title of Selecti 1.1	uted in the passage in pla 4 Maze administration, the common the three choices the plan of Maze passages a ions: This Maze Passages started, type or paste the the passage. NOTE: To ing Foils for the Maze Pass Basic list of common E not select another choice Words selected random choice for more technical Your own word list. You you are ready to go to the	portation into a response nerr that con- sec of the original, correct word). The e reader alently reads the Maze pass t best restores the meaning of that as and administration can be found in the e Generator largely automates the wi- e passage that you would like to con- compute readability, click on the COI assage. The application allows you the inglish words. The application select the inglish words. The application select here, to ensure that foils are consiste u can enter a word list of your own the e next screen, click the NEXT button.	sists of the ong set three choice age; whenever gment of the p manual <u>Using</u> ork of creating a art in the Passa JPUTE button I are choices in ar a foils from a lis ion uses words nt with the over at the applicatio	inal word plus two s are randomly at a ser randomly at sssage. The read <u>CBU for Progress</u> a Maze passage v rage box below. Yo below under 'Rea alecting foils to be at of common wor randomly pulled rail passage control n will use in selec	foils (wo ranged as er continu- er continu- tion user- with user- u can also dability E: included day this is from your rational from your rational from your rational from your	rids that would r nd inserted back ponse item, th les until time as an in Reading ( antered content o optionally typ dimates'. in the Maze re- the default out passage as foi foils for the Max	not make sense k into the text. e resder circles pires: A good Fuchs & Fuchs, e in the Author e aponses: come if the user ls. This can be s ze passage.	if During the andior does
substh s timed word fr descrip 2007). Directi To get Title of Selecti 2. 1	uted in the passage in pla 1 Maze administration, th om the three choices tha bion of Maze passages a ions: This Maze Passage started, type or paste the the passage. NOTE: To ing Foils for the Maze Pas- Basic list of common E not select another choice Words selected randon choice for more technica Your own word list. You you are ready to go to the	sonated into a response nem that con- sec of the original, correct word). The e reader silently reads the Maze pass best restores the meaning of that as ind administration can be found in the e Generator largely automates the wi e passage that you would like to conv compute readability, click on the COI asage. The application allows you the inglish words. The application select . If from your passage. The applica- list, to ensure that foils are consiste u can enter a word list of your own the e next screen, click the NEXT button.	sists of the onig set three choices age; whenever gment of the p manual <u>Using</u> ork of creating s art in the Passa APUTE button I are choices in are a foils from a lis ion uses words nt with the over it the applicatio	inal word plus two s are randomly at a sare randomly at sosage. The read <u>CBM for Progress</u> a Maze passage v ige box below. Yo below under Rea electing foils to be at of common work randomly pulled in will use in select in will use in select	foils (wo ranged a lers a nei roontinu - Nontionitori w can also dability E: included ds; this is included ds; this is from your ant.	ids that would in nd inserted back ponse item, the es until time ex- ing in Reading ( entered content o optionally type timates', in the Maze re: the default out passage as foi foils for the Max	not make sense k into the text. e reader circles pires: A good Fuchs & Fuchs, e in the Author s aponses: come if the user ls. This can be s ze passage.	if During the andior does a good

URL: http://www.interventioncentral.org/teacher-resources/test-of-reading-comprehension

www.interventioncentral.org

66

"...One way I have used the Maze in the past at the secondary level, is as a targeted screener to determine an instructional match between the student and the text materials. By screening all students on one to three Maze samples from the text and/or books that were planned for the course, we could find the students who could not handle the materials without support (study guides, highlighted texts, alternative reading material). ... This assessment is efficient and it seems quite reliable in identifying the potential underachievers, achievers, and overachievers. The real pay back is that success can be built into the courses from the beginning, by providing learning materials and supports at the students' instructional levels."

"

Lynn Pennington, Executive Director, SSTAGE

(Student Support Team Association for Georgia Educators)

Early Math Fluency: Measuring 'Number Sense'

• Early Math Fluency measures track primarygrade students' acquisition of number sense (defined as mastery of internal number line)



• Early Math Fluency: Quantity Discrimination [1 minute]: The student is given a worksheet with number pairs and, for each pair, identifies the larger of the two numbers.

Quantity Discrimination (QD): 1 Minute: The student is presented with pairs of numbers randomly sampled from 1-20 and must identify the larger number in each pair.

Grade	Fall QD (Chard et al., 2005)	Fall:+/-1 SD (≈16th%ile to 84th%ile)	Winter QD (Chard et al., 2005)	Winter: +/-1 SD (≈16th%ile to 84th%ile)	Spring QD (Chard et al., 2005)	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth
K	15	8↔22	20	8↔32	23	12↔34	0.25
1	23	16↔30	30	21↔39	37	28↔46	0.44

Source: Chard, D. J., Clarke, B., Baker, S., Otterstedt, J., Braun, D., & Katz, R. (2005). Using measures of number sense to screen for difficulties in mathematics: Preliminary findings. Assessment for Effective Intervention, 30(3), 3-14.

Early Math Fluency: Missing Number [1 minute]: The student is given a worksheet with 4-digit number series with one digit randomly left blank and, for each series, names the missing number. 14
 16

Missing Number (MN): 1 Minute: The student is presented with response items consisting of 3 sequential numbers with one of those numbers randomly left blank. (Each 3-number series is randomly generated from the pool of numbers 1-20.) The student attempts to name the missing number in each series.

Grade	Fall	Fall: +/-1	Winter	Winter: +/-1	Spring	Spring: +/-1	Weekly
	MN (Chard et al., 2005)	SD (≈16th%ile to 84th%ile)	MN (Chard et al., 2005)	<b>SD</b> (≈16th%ile to 84th%ile)	MN (Chard et al., 2005)	SD (≈16th%ile to 84th%ile)	Growth
K	3	0↔7	10	3↔17	14	7↔21	0.34
1	9	3↔15	17	11↔23	20	14↔26	0.34

Source: Chard, D. J., Clarke, B., Baker, S., Otterstedt, J., Braun, D., & Katz, R. (2005). Using measures of number sense to screen for difficulties in mathematics: Preliminary findings. Assessment for Effective Intervention, 30(3), 3-14.

• Early Math Fluency: Number Identification [1 minute]: The student is given a worksheet randomly generated numbers and reads off as many as possible within the time limit.

Number Identification (NID): 1 Minute: The student is presented with a randomly generated series of numbers ranging from 1-20 and names as many of those numbers aloud as time allows.

Grade	Fall NID (Chard et al., 2005)	Fall: +/-1 SD (≈16th%ile to 84th%ile)	Winter NID (Chard et al., 2005)	Winter: +/-1 SD (≈16th%ile to 84th%ile)	Spring NID (Chard et al., 2005)	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth
K	14	<mark>0⇔28</mark>	45	27↔63	56	38↔74	1.31
1	34	18↔50	53	36↔70	62	46↔78	0.88

Source: Chard, D. J., Clarke, B., Baker, S., Otterstedt, J., Braun, D., & Katz, R. (2005). Using measures of number sense to screen for difficulties in mathematics: Preliminary findings. Assessment for Effective Intervention, 30(3), 3-14.

#### Response to Int



The application to create CBM Early Math Fluency probes online

Quantity Discrimination (QD)

Numberfly Early Math Fluency Generator http://www.interventioncentral.org

Use this free online application to design and create Early Math Fluency Probes, including:

- Quantity Discrimination
- •Missing Number
- •Number Identification

nt is given a sheet of number pairs and a larger of the two values for each pair.
numbers to minination items:
TO 20 🔻
tion items should appear in each row?:
Id appear on the student worksheet?:
Submit
directions for administering and scoring Quantity statistics, & brief guidelines for use in an RTI process
-series graph to chart student progress using Quantity
sing Number (MN)
nt is given a sheet that contains a series of ces. In each sequence, one number is ust verbally identify the missing number.
numbers to be selected in the missing number items:
TO 20 🔻
ns should appear <i>in each row</i> ?:
pear in each number series?

# Math Computation Fluency

 Students should have fluent recall of basicoperation math facts to prepare them for demanding math courses in middle and high school. Benefits of Automaticity of 'Arithmetic Combinations' (Gersten, Jordan, & Flojo, 2005)

- There is a strong correlation between poor retrieval of arithmetic combinations ('math facts') and global math delays
- Automatic recall of arithmetic combinations frees up student 'cognitive capacity' to allow for understanding of higher-level problem-solving
- By internalizing numbers as mental constructs, students can manipulate those numbers in their head, allowing for the intuitive understanding of arithmetic properties...

Source: Gersten, R., Jordan, N. C., & Flojo, J. R. (2005). Early identification and interventions for students with mathematics difficulties. Journal of Learning Disabilities, 38, 293-304.

• Math Computation Fluency [2 minutes]: The student is given a math-fact worksheet and completes as many problems as possible. The worksheet is scored for number of correct digits.

Curriculum-Based Measurement: Computation Fluency Norms
(Burns, VanDerHeyden, & Jiban, 2006; Deno & Mirkin, 1977; Fuchs & Fuchs, 1993; Fuchs &
Fuchs, n.d.)*
CBM-Computation Fluency measures a student's accuracy and speed in completing 'math facts' using the basic number operations of addition, subtraction, multiplication, and division. Computation fluency in the elementary grades is a strong predictor of later success in higher-level math coursework (Gersten, Jordan, & Flojo, 2005). CBM-Computation Fluency probes are 2-minute assessments of basic math facts that are scored for number of 'correct digits'.

Grade	End of Year Benchmark:	Weekly Growth:	Weekly Growth:
	Correct Digits per 2 Mins	'Realistic'	'Ambitious'
	(Fuchs & Fuchs, n.d.)	(Fuchs & Fuchs, 1993)	(Fuchs & Fuchs, 1993)
1	20	0.3	0.5

• Math Computation Fluency [2 minutes]: The student is given a math-fact worksheet and completes as many problems as possible. The worksheet is scored for number of correct digits.

Curriculum-Based Measurement: Computation Fluency Norms (Burns, VanDerHeyden, & Jiban, 2006; Deno & Mirkin, 1977; Fuchs & Fuchs, 1993; Fuchs & Fuchs, n.d.)*				
Grade	Performance Level	Correct Digits per 1 Min (Burns, VanDerHeyden, & Jiban, 2006)	Weekly Growth: 'Realistic' (Fuchs & Fuchs, 1993)	Weekly Growth: 'Ambitious' (Fuchs & Fuchs, 1993)
0	Mastery	More than 31		
Ζ	Instructional	14-31	0.3	0.5
	Frustration	Less than 14		
0	Mastery	Mastery More than 31		
3	Instructional	14-31	0.3	0.5
	Frustration	Less than 14		
Л	Mastery	More than 49		
4	Instructional	24-49	0.75	1.2
	Frustration	Less than 24		
Г	Mastery	More than 49		
5	Instructional	24-49	0.75	1.2
	Frustration	Less than 24		
		www.intervention	central.org	

• Math Computation Fluency [2 minutes]: The student is given a math-fact worksheet and completes as many problems as possible. The worksheet is scored for number of correct digits.

Curriculum-Based Measurement: Computation Fluency Norms			
(Burns, VanDerHeyden, & Jiban, 2006; Deno & Mirkin, 1977; Fuchs & Fuchs, 1993; Fuchs &			
Fuchs, n.d.)*			

Grade	Performance Level	Correct Digits per 2 Mins (Deno & Mirkin, 1977)	Weekly Growth: 'Realistic' (Fuchs & Fuchs, 1993)	Weekly Growth: 'Ambitious' (Fuchs & Fuchs, 1993)
6	Mastery	More than 79		
6	Instructional	40-79	0.45	1.0
	Frustration	Less than 40		

# Mechanics & Conventions of Writing

• Tracking student growth in emerging writing skills can be confusing and time-consuming for teachers.

However, Curriculum-Based Measurement-Written Expression (CBM-WE) is an efficient, reliable method of formative student assessment that yields numeric indicators that are instructionally useful--such as total words written, correctly spelled words, and correct writing sequences.

Response	Gurriculum-Based Measurement: Written Expression Probe
CBM-Written Expression: Sample Story Starter	Curriculum-Based Measurement: Written Expression Probe     Student Name:   Classroom:   Date:   One day, I was in my boat and a storm came up and carried me to a desert island. To survive
Source: Writing Probe Generator. Available at http://www.interventioncentral.org/teacher- resources/curriculum-based-measurement-probes-writing	Total Words: Correctly Spelled Words: Correct Writing Sequence:

www.interve

www.interventioncentral.org • Copyright © 2009 - 2015 Jim Wrig

# CBM Writing Assessment: Scoring Total Words:

I woud drink water from the ocean and I woud eat the fruit off of the trees. Then I woud bilit a house out of trees, and I woud gather firewood to stay warm. I woud try and fix my boat in my spare time.

# Total Words = 45

• **CBM-WE: Total Words Written** [4 Minutes]. The student's writing sample is scored for the total words written.

Total Words Written (TWW): This measure is a count of the total words written during the CBM-WE					
Grade	Fall TWW (Malecki & Jewell, 2003)	Fall:+/-1 SD (≈16th%ile to 84th%ile)	Spring TWW (Malecki & Jewell, 2003)	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth (Tadatada, 2011)
1	8	3⇔ <b>1</b> 3	14	7↔21	0.45
2	24	14↔34	31	19↔43	0.43
3	36	23↔49	36	24↔48	0.35
4	41	30↔52	46	30↔62	0.25
5	51	34↔68	67	43↔91	
6	44	31↔57	58	44↔72	

Source: Gansle, K. A., VanDerHeyden, A. M., Noell, G. H., Resetar, J. L., & Williams, K. L. (2006). The technical adequacy of curriculumbased and rating-based measures of written expression for elementary school students. School Psychology Review, 35, 435-450.

# CBM Writing Assessment: Scoring Correctly Spelled Words:

I woud drink water from the ocean and I woud eat the fruit off of the trees. Then I woud bilit a house out of trees, and I woud gather firewood to stay warm. I woud try and fix my boat in my spare time.

# Correctly Spelled Words = 39

www.interventioncentral.org

• **CBM-WE: Correctly Spelled Words** [4 Minutes]. The student's writing sample is scored for the number of words spelled correctly.

Correctly Spelled Words (CSW): This measure is a count of correctly spelled words written during the CBM-WE assessment.

Grade	Fall	Fall:+/-1 SD	Spring	Spring: +/-1 SD	Weekly
	CSW	(≈16th%ile to 84th%ile)	CSW	(≈16th%ile to 84th%ile)	Growth
	(Malecki & Jewell, 2003)		(Malecki & Jewell, 2003)		(Tadatada, 2011)
1	5	1↔9	10	3↔17	0.45
2	20	10↔30	27	15↔39	0.46
3	32	19↔45	33	21↔45	0.37
4	38	26↔50	44	29↔59	0.26
5	48	31↔65	65	42↔88	
6	42	29↔55	56	41↔71	

Source: Gansle, K. A., VanDerHeyden, A. M., Noell, G. H., Resetar, J. L., & Williams, K. L. (2006). The technical adequacy of curriculumbased and rating-based measures of written expression for elementary school students. School Psychology Review, 35, 435-450.

CBM Writing Assessment: Scoring Correct Writing Sequences: I woud drink water from the ocean and woud eat the fruit off of the trees. Then I woud bilit a house out of trees, and I woud gather firewood to stay warm. I woud try and fix my boat in my spare time.

# Correct Writing Sequences = 37

 CBM-WE: Correct Writing Sequences [4 Minutes]. A point is scored whenever two adjacent units of writing (e.g., two words appearing next to each other) are correct in punctuation, capitalization, spelling, and syntactical and semantic usage.)

Correct Writing Sequences (CWS): This measure is a tabulation of correct 'writing sequences' written during the CBM-WE assessment. One Correct Writing Sequence is scored whenever two adjacent units of writing (e.g., two words appearing next to each other) are found to be correct in their punctuation, capitalization, spelling, and syntactical and semantic usage.

Grade	Fall CWS	Fall:+/-1 SD (≈16th%ile to 84th%ile)	Spring CWS	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth
	(Malecki & Jewell, 2003)		(Malecki & Jewell, 2003)		(Tadatada, 2011)
1	2	0↔4	7	1↔13	0.36
2	15	5↔25	24	11↔37	0.44
3	28	14↔42	31	18↔44	0.35
4	38	25↔51	42	26↔58	0.22
5	46	28↔64	63	40↔86	
6	41	27↔55	54	37↔71	

Source: Gansle, K. A., VanDerHeyden, A. M., Noell, G. H., Resetar, J. L., & Williams, K. L. (2006). The technical adequacy of curriculumbased and rating-based measures of written expression for elementary school students. School Psychology Review, 35, 435-450.

#### Writing Probe Generator

Create a probe to assess the mechanics and conventions of student writing.

_						
Respons	INTERVENTION CENTRAL     Your source for RTI resources					
	Home Academic Interventions Behavior Interventions Products Workshops CBM Downloads RTI Help Contact					
	Writing Probe Generator					
	If you have any suggestions or comments about this tool, please mail me.					
	Response to Infervention Track, Document, Monitor & Manage RTI Data Made Easy www.RTInDirectom Infervention Specialist Family Addiction Intervention. Don't wait for bottom: (Figure 2002/2008) Early Enginementor.com Complete Solution for RTI Benchmark and Targeted Assessments Online or Paper, Districtive www.blwebbornautig.com Common Core Addivities Online Tests, Lessons, and Morel Reading, Writing, Meth Content www.aug/Online.com (Adthoness P) Written Expression Probe Generator					
	Curriculum-Based Measurement Written Expression probes are brief, timed (4-minute) assessments that look at a student's mastery of writing mechanics and conventions. The student is given a 'story starter', a brief introductory story stem that serves as a stimulus for the student to create his or her own writing sample.					
	Writen expression probes can be used at any grade level in which students are still working on such writing skills as punctuation, grammar, spelling, and capitalization. They can also be administered to individual students or entire groups. NOTE: You can download instructions for administering and scoring CBM Writen Expression probes by clicking <u>here</u> .					
	Directions: You can use this application to generate your own custom CBM Written Expression Story Starter to use immediately with your student (s). Just follow these steps:					
	<ol> <li>Select a title [optional]. You can give your story starter sheet a custom title (e.g., 'Jim's Writing Sample: October 24, 2011') by typing your title into the textbox 'Select a title for this worksheet' below.</li> <li>Select or write a story starter. Enter a story starter of your choosing into the textbox 'Type in the story starter' below. Of course, you can write your own story starter. Or you can click on any of the pre-formatid story starters on the right side of the page and that story starter will automatically load into the text box for you to edit as needed.</li> </ol>					
	<ol> <li>Download and view the Writing Probe Sheet. When you have finished formatting your writing probe, you can download and view it in pdf format by clicking on the 'Download PDP' button.</li> </ol>					
	4. Email the Writing Probe Sheet [optional]. As a convenience, this application allows you to email your finished Writing Probe Sheet to whomever you choose by clicking on the 'Email PDP' button and following directions to enter your own email address as well as that of the intended recipient.					
	Select a title for this worksheet (optional)					
	Type in the 'story starter' The cockeeper noticed that the cock was open and					
	forwitous     1 I next +     1. In the morning, I opened my door and now     five horners standing in the street. Then					
	2. When the anow storm began, the lights went out just before □     3. The boy was on his way to see the dimensur in the museum when					
	<ol> <li>When the woman looked out her window one morning, the new that a large meteorite from</li> </ol>					

URL: http://www.interventioncentral.org/tools/writing-probe-generator

www.interventioncentral.org

#### Curriculum-Based Measures (CBMs)

CBM	Skill Area	Activity	
Letter Sound Fluency/Letter Name Fluency	Alphabetics/ Phonics	1 Minute: Student reads letter names or sounds from a randomly generated list.	
Oral Reading Fluency	Reading Fluency	1 Minute: Student reads aloud from a text passage.	
Reading Comprehension Fluency (Maze)	Reading Comprehension	3 Minutes: Student <b>reads silently</b> from a <b>Maze passage</b> and selects correct word in each choice item that restores meaning to the passage.	
Early Math Fluency	Number Sense	1 Minute: Student completes an Early Math Fluency probe: (1) Quantity Discrimination; (2) Missing Number; or (3) Number Identification	
Computation Fluency	Math Fact Fluency	2 Minutes: Student <b>completes math facts</b> and receives credit for each <b>correct digit</b> .	
Written Expression	Mechanics/ Conventions of Writing	4 Minutes: Student reads a story-starter (sentence stem), then produces a writing sample that can be scored for Total Words Written, Correctly Spelled Words, Correct Writing Sequences.	

# 1. Curriculum-Based Measurement

• How to Set a Goal. CBM measures typically are accompanied by research norms that allow the teacher to set student performance goals.

Curriculum-Based	InterventionCentr <mark>al</mark> S-Minute 'Count Down' Timer		
СВМ	Skill Area	Activity	05:00 www.interventioncentral.org
Letter Sound	Alphabetics/	1 Minute: Student reads letter names or so	unds from a
Curriculum-Bas			
At your tables:	assage.		
<ul> <li>Select a C are interes</li> </ul>	<b>te passage</b> that restores		
<ul> <li>Discuss ho classroom</li> </ul>	luency probe: mber; or (3)		
Be prepared to r	d receives		
	Fluency	credit for each correct digit.	
Written Expression	Mechanics/ Conventions of Writing	4 Minutes: Student reads a story-starter (sentence stem), then produces a writing sample that can be scored for Total Words Written, Correctly Spelled Words, Correct Writing Sequences.	