


Implementing Science-Based Practice In Schools for Screening and Treating Dyslexia

 @burnsmk1

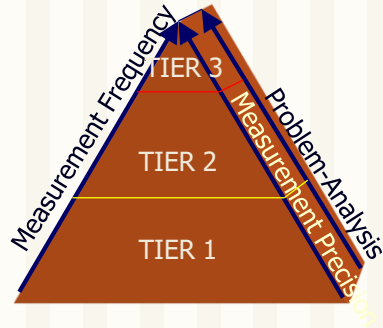
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Montana Dyslexia Law

- (c) If a screening under subsection (3)(b) suggests that a child may have dyslexia or a medical professional diagnoses a child with dyslexia, the child's school district shall take steps to identify the specific needs of the child and implement best practice interventions to address those needs. This process may lead to consideration of the child's qualification as a child with a disability under the Individuals With Disabilities Education Act.

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MTSS and Problem-Solving



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Problem Solving

Tier I – Identify discrepancy between expectation and performance for class or individual (**Is there a classwide need?**)

Tier II – Identify discrepancy for individual. Identify category of problem. (**What is the category of the problem?**)

Tier III – Identify discrepancy for individual. Identify causal variable. (**What is the causal variable?**)

All Tiers – Identify discrepancy between expectation and performance for student progress (**Is the student making adequate progress?**)

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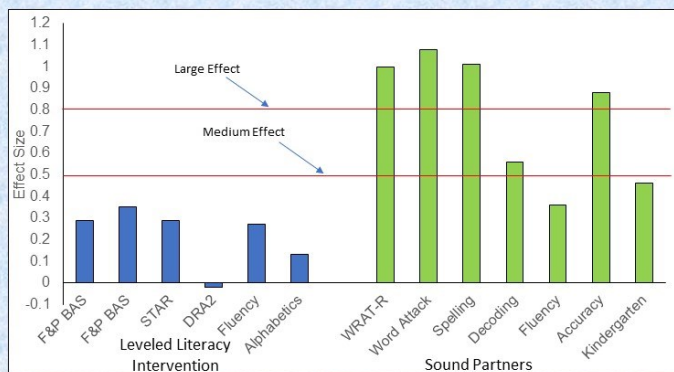
Leveled Literacy Intervention

- Effect Sizes
- Kindergarten = 0.26
- First Grade = 0.36
- Second Grade = **-0.09**

Ransford-Kaldon, C. R., Flynt, E. S., Ross, C. L., Franceschini, L. A., Zoblotzky, T. A., Huang, Y., & Gallagher, B. (2010). Implementation of effective intervention: An empirical study to evaluate the efficacy of Fountas & Pinnell's Leveled Literacy Intervention Program (LLI) for 2009-2010. Memphis, TN: The University of Memphis, Center for Research in Educational Policy.

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How Effective is the Leveled Literacy Intervention for K-2 Students?



Fountas & Pinnell:

- BAS – Diagnostic accuracy of 54% for identifying struggling readers (Parker et al., 2015)
- 58% of Struggling readers could not read the book that was at their level according to F&P (Burns et al., 2015)

Sources:

LLI - https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/wwc_leveledliteracy_091917.pdf

Sound Partners - <https://charts.intensiveintervention.org/aintervention>

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Student	MAP RIT	MAP %ile	F&P	ORF	Accuracy
1	149	1	G	30	77%
2	158	3	G	37	88%
3	159	4	G	30	94%
4	170	27	G	32	87%
5	166	17	G	58	89%
6	188	73	G	80	98%
7	157	1	G	26	93%
8	149	1	G	27	84%
9	160	6	G	36	86%
10	154	1	G	30	77%
11	160	6	G	31	82%
12	166	17	G	44	90%
13	163	11	G	47	90%
14	161	8	G	61	95%
15	167	19	G	70	100%
16	155	1	G	17	77%

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National Reading Panel

- Is phonemic awareness instruction effective in helping children learn to read?
- Reviewed 52 studies of PA instruction.
- Three general outcomes were explored
 - PA tasks such as phoneme manipulation,
 - spelling,
 - and reading tasks such as word reading, pseudoword reading, reading comprehension, oral text reading, reading speed, time to reach a criterion of learning, and miscues

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National Reading Panel Results

- PA instruction demonstrated better efficacy over alternative instruction models or no instruction
- Improved PA measures (strong), reading ($d = .53$) and spelling skills
- Teaching one or two PA skills was preferable to teaching three or more
- PA instruction benefited reading comprehension (Ehri et al.).

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Means and Ranges of Effect Sizes by Reading Outcome Measure

	N	Mean ES	SD	Minimum	Maximum
Pseudowords	24	0.84	0.80	-0.19	3.60
Words in Isolation	48	0.92	0.89	-0.05	4.33
Contextual Reading	24	0.37	0.38	-0.37	1.18

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Assess 4 NRP Areas



Phonemic Awareness

Phoneme segmentation fluency (PAI, CTOPP)



Phonics

Nonsense word fluency (WJ Pseudoword)



Fluency

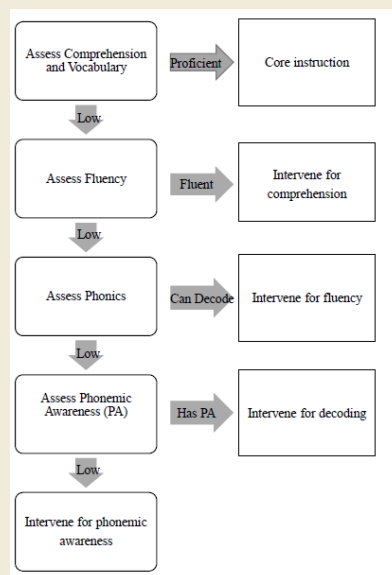
CBM-R (TOSCRF)



Vocabulary/Comprehension

Measures of Academic Progress or STAR Reading

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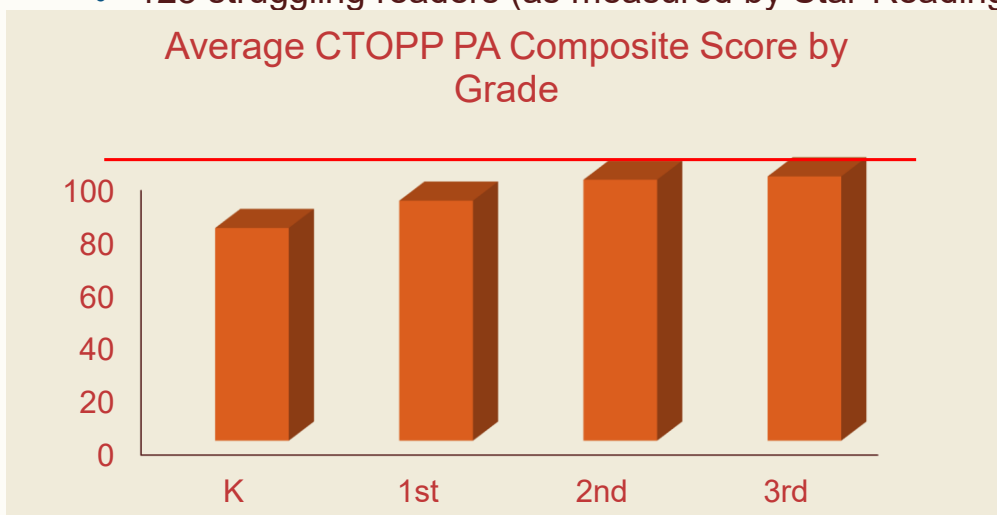
Grade	Phonemic Awareness	Phonics	Fluency	Comprehension
Kindergarten	Road to the Code	Sound Partners	NA	NA
First Grade	Road to the Code	Sound Partners	NA	NA
Second Grade	Phonological Awareness Tools and Strategies	Sound Partners	Read Naturally	LSC: Inferencing
Third Grade	NA	Phonics for Reading	Read Naturally	LSC: Inferencing
Fourth Grade	NA	REWARDS	Read Naturally	LSC: Inferencing
Fifth Grade	NA	REWARDS	Read Naturally	LSC: Inferencing

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PA and Struggling Readers

- 123 struggling readers (as measured by Star-Reading)

Average CTOPP PA Composite Score by Grade



$F(3, 119) = 13.36, p < .001, \eta^2 = .25$

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Relationship Between DIBELS Composite and CTOPP Score

Grade	N	Correlation	Number of Students Low PA
Kindergarten	28	.35*	20 (70%)
First Grade	26	.19	10 (38%)
Second Grade	32	.27	7 (21%)
Third Grade	37	.02	5 (14%)

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Regression of Oral Reading Fluency on Phonemic Awareness (as Measured by Comprehensive Test of Phonological Processing Second Edition) and Reading Decoding (as Measured by Nonsense Word Fluency) with Decoding in Model 2 with Students in Second and Third Grades (n = 69).

Variable	Model 1				Model 2				Model 3			
	B	SE	Beta	T	B	SE	Beta	t	B	SE	Beta	t
Constant	-0.16	0.71		-0.23	-0.42	0.47		-0.89	-0.31	0.54		-0.57
Phoneme Blending	0.04	0.05	.11	0.85	0.01	0.03	.02	0.29	0.01	0.04	.03	0.36
Phoneme Isolation	-0.04	0.06	-.08	-0.67	0.04	0.04	.08	0.93	0.04	0.04	.08	0.99
Reading Decoding					0.77	0.08	.77	9.27	0.79	0.10	.78	8.33*
Phoneme Elision									-0.02	0.04	-.04	-0.47
p < .05	R ² = .02, Δ = .02, F = 0.51				R ² = .58, Δ = .56, F = 85.85				R ² = .58, Δ < .01, F = 0.22			

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Category of Problem MN HS

- 9-12 with approximately 1600 students
- 69.2% pass reading
- 9th-10th grade
- 28% low on MAP (~225)
- 45% Low on TOSCRF (~100)
 - 64% low on phonics (~65)
 - 36% acceptable phonics (~36)

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1.	GO HOME
2.	STOP NOW
3.	HELP ME RIDE FAST
11 4.	SIT DOWN LOOK AROUND
17 5.	TWO GIRLS WENT TO A FARM FOR A VISIT THERE WERE COWS PIGS DUCKS AND FIVE HENS THE GIRLS GATHERED THE EGGS EVERY MORNING
15 6.	FATHER WENT OUT TO BUY SOME PRETTY FLOWERS THE CAKE COOKED A LITTLE TOO LONG SO IT WAS BROWN

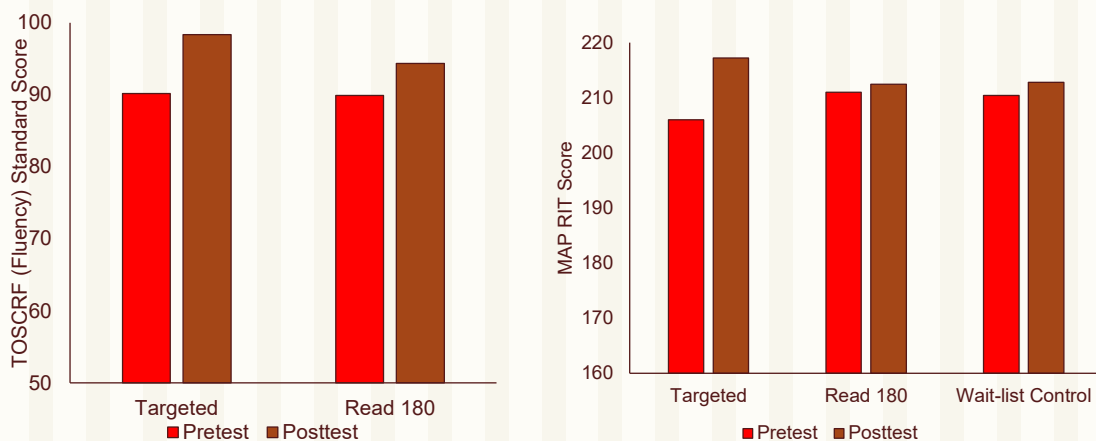
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Groups

- Randomly assigned to two groups
 - Read 180
 - Targeted (phonics – REWARDS, fluency – Read Naturally, comprehension – Read 180)
- Wait list control group
- 20 minutes each day for 13 weeks in addition to reading and study skills

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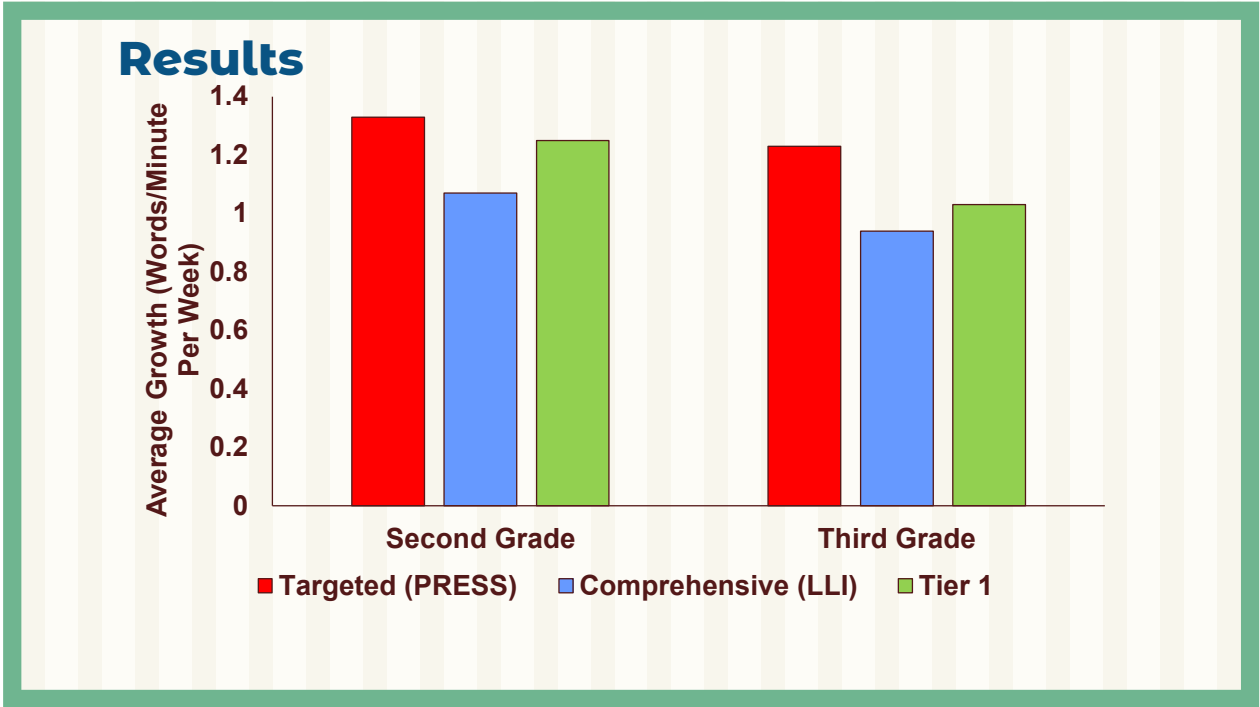
Targeting Intervention at Tier 2 - HS



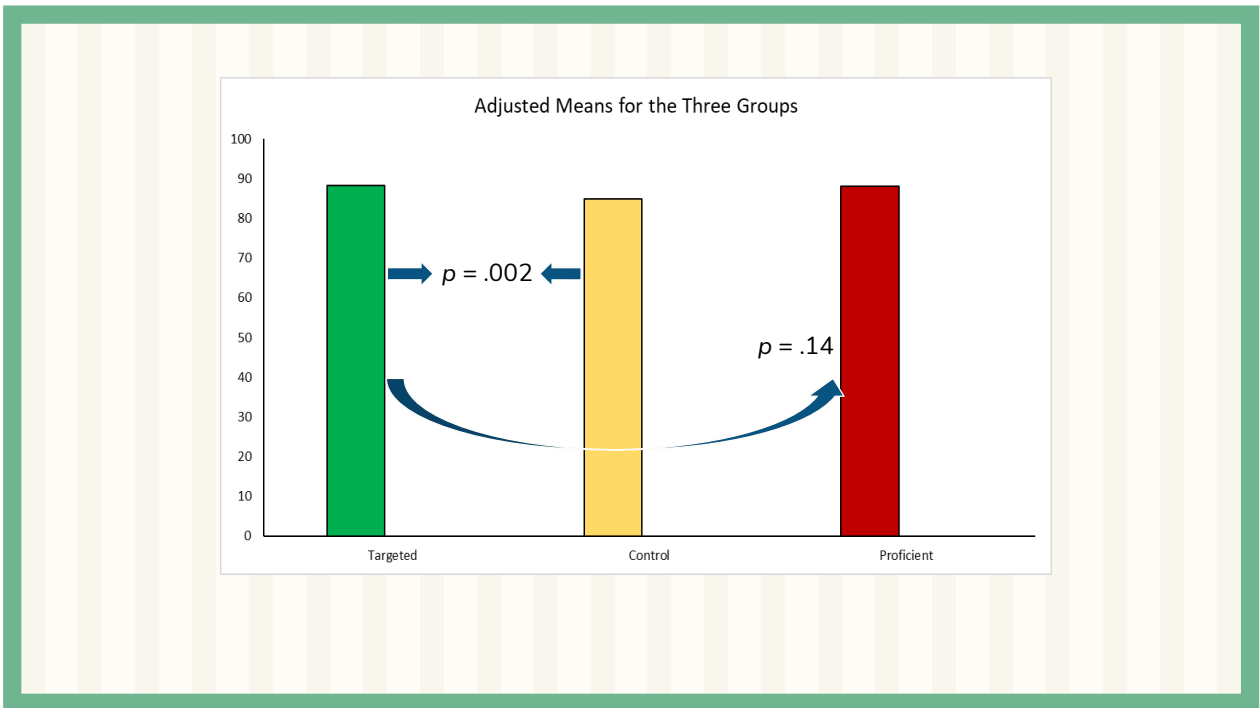
ANCOVA for fluency $F(1, 42) = 4.98, p < .025, d = 0.50$

ANCOVA for MAP $F(2, 74) = 5.84, p < .025, \eta^2 = .14$.

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Meta-Analysis

- 24 studies of K-8 small-group reading interventions
 - 27 effects
- Median $g = 0.54$
- Age
 - K-2 = 0.66
 - 3-8 = 0.22
- Targeted (comprehension, fluency, vocabulary, decoding, phonemic awareness)
 - 14 effects, $g = 0.65$
- Comprehensive
 - 13 effects $g = 0.33$

Hall & Burns (2018)

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Student	MAP RIT	RIT %ile	ORF	Accuracy
2	144	1	2	20%
36	146	1	7	41%
33	148	1	11	52%
34	160	6	22	82%
10	158	3	23	77%
27	158	3	27	87%
7	154	1	30	77%
11	160	6	31	82%
6	160	6	36	86%
5	152	1	38	91%
4	169	24	42	91%
32	166	17	44	90%
37	161	8	50	96%
17	174	37	54	95%
9	162	9	57	88%
30	155	1	57	93%
26	166	17	58	92%
3	177	45	68	96%
19	180	53	68	94%
22	190	78	72	99%
13	172	32	74	96%
1	175	39	75	95%
8	187	71	76	96%
14	182	58	78	99%
31	172	32	81	96%
25	176	42	86	99%
38	184	64	97	97%
28	193	84	100	99%
23	191	80	105	98%
18	188	73	110	99%
21	178	47	110	99%
16	186	69	116	99%
35	181	56	140	100%

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Second Grade Practice Data

- ❖ What is the class median?
- ❖ Does this class need a class-wide intervention?
- ❖ Why?
- ❖ Use the Intervention Flowchart to decide what is appropriate for this class.
- ❖ Assign student partnerships, if appropriate.

Student Partnerships	
Coach	Reader

Spring Benchmark		90		
Student	Grade	ORF		Accuracy
		WRC	Errors	
A	2	31	6	83.8%
B	2	47	5	90.4%
C	2	47	4	92.2%
D	2	48	4	92.3%
E	2	51	2	96.2%
F	2	54	3	94.7%
G	2	55	4	93.2%
H	2	58	7	89.2%
I	2	61	7	89.7%
J	2	61	1	98.4%
K	2	65	0	100%
L	2	71	1	98.6%
M	2	78	2	97.5%
N	2	82	6	93.2%
O	2	84	0	100%
P	2	86	0	100%
Q	2	95	0	100%
R	2	98	2	98.0%
S	2	108	1	99.1%
T	2	121	2	98.4%
U	2	141	3	97.9%
Class Median				

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Third Grade Practice Data

- ❖ What is the class median?
- ❖ Does this class need a class-wide intervention?
- ❖ Why?
- ❖ Use the Intervention Flowchart to decide what is appropriate for this class.
- ❖ Assign student partnerships, if appropriate

Student Partnerships	
Coach	Reader

Winter Benchmark		91		
Student	Grade	ORF		Accuracy
		WRC	Errors	
A	3	34	6	
B	3	41	5	
C	3	44	4	
D	3	58	4	
E	3	67	2	
F	3	78	3	
G	3	83	4	
H	3	87	7	
I	3	89	7	
J	3	93	1	
K	3	94	0	
L	3	96	1	
M	3	97	2	
N	3	100	6	
O	3	112	0	
P	3	125	0	
Q	3	130	0	
R	3	149	2	
S	3	156	1	
T	3	161	2	
Class Median				

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Analysis to Action
Benchmark Data Worksheet 3rd grade

Meeting Date: 1/21/23 Teacher Name: Burke Assessment Analyzed: ORF Class Wide Median: 93.5

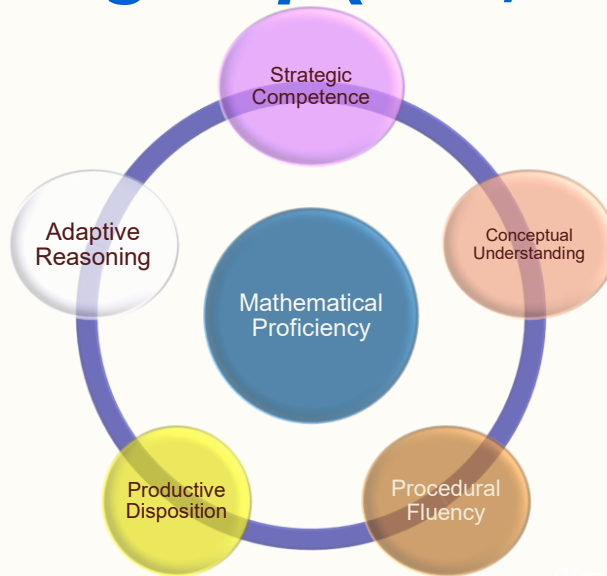
Determine Need: Is a Whole Class Intervention necessary? Yes <input type="radio"/> No <input checked="" type="radio"/>		Action Items: <ul style="list-style-type: none"> Determine appropriate Class Wide Intervention: Determine Start Date: _____ Determine End Date: _____ Schedule Fidelity Check: _____ Progress Monitor Assessment: _____ 	
Which students fall within the at-risk range? Are there any students we missed?		Among students identified as needing a Tier 2 intervention, what is the category of the problem? (phonemic awareness, decoding, fluency, vocabulary, comprehension)	
Student Name:	WRC/Error	Accuracy	
1. Student A	34/6	.85	Decoding
2. Student B	41/5	.89	Decoding
3. Student C	44/4	.92	Decoding
4. Student D	58/4	.94	Fluency
5. Student E	67/2	.97	Fluency
6. Student F	78/3	.96	Fluency
7. Student G	83/4	.95	Fluency
8. Student H	87/7	.93	Decoding/Fluency
9. Student I	89/7	.93	Decoding/Fluency

Benchmark Criterion FALL: 70 WRC WINTER: 91 WRC SPRING: 109 WRC

ACCURACY
 $\geq 93\%$
 Fluency
 intervention

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Adding it Up (NRC, 2001)



(Van de Walle, 2010)

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Strands of Proficiency	Instructional Implication
Conceptual Understanding	Fosters the developmental knowledge of relationships and ideas that underlie the problem.
Procedural Knowledge	Fosters the developmental understanding of the steps needed to solve a problem.
Strategic Competence	Fosters the development of learning to flexibly solve problems using multiple strategies.
Adaptive Reasoning	Fosters the development of learning to justify the correct answer and demonstrate reasoning.
Productive Disposition	Fosters the development of viewing math as useful and worthwhile, while increasing students' confidence.

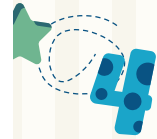


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Table 7 Skill sequence 2003–2004	
2nd Grade	3rd Grade
1. Addition facts 0–20	1. Addition and subtraction facts 0–20
2. Subtraction facts 0–9	2. Fact families addition and subtraction 0–20
3. Subtraction facts 0–12	3. Three-digit addition without and with regrouping
4. Subtraction facts 0–15	4. Three-digit subtraction without and with regrouping
5. Subtraction facts 0–20	5. Two- and three-digit addition and subtraction with and without regrouping
6. Mixed subtraction/addition 0–20	6. Multiplication facts 0–9
7. Fact families addition and subtraction 0–20	7. Division facts 0–9
8. Two-digit addition without regrouping	8. Fact families multiplication and division 0–9
9. Two-digit addition with regrouping	9. Add/subtract fractions with like denominators
9. Two-digit subtraction without regrouping	10. Single-digit multiplied by double/triple digit
11. Two-digit subtraction with regrouping	11. Without regrouping
12. Three-digit addition without and with regrouping	12. Single-digit multiplied by double/triple digit with regrouping
13. Three-digit subtraction without and with regrouping	13. Single-digit divided into double/triple digit without remainders
14. 2nd Grade monthly math probe	14. Add and subtract decimals to the hundredths

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4th Grade	5th Grade
1. Multiplication facts 0–12	1. Multiplication facts 0–12
2. Division facts 0–12	2. Division facts 0–12
3. Fact families multiplication/division 0–12	3. Fact families multiplication/division 0–12
4. Single-digit multiplied by double-digit with and without regrouping	4. Multiply two- and three-digit with and without regrouping
5. Double-digit multiplied by double-digit without regrouping	5. Single-digit divisor divided into double-digit dividend with remainders
6. Double-digit multiplied by double-digit with regrouping	6. Single-digit divisor divided into double- and triple-digit dividend with remainders
7. Single-digit divisor into double-digit dividend without remainders	7. Reduce fractions to simplest form
8. Single-digit divisor into double-digit dividend with remainders	8. Add/subtract proper fractions/mixed numbers with like denominators with regrouping
9. Single-and double-digit divisor into single- and double-digit dividend with remainders	9. Add/subtract decimals
10. Add/subtract fractions with like denominators no regrouping	10. Multiply/divide decimals
11. Multiply multi-digit numbers by two numbers	11. Double-digit divisor into four-digit dividend
12. Add and subtract decimals to the hundredths	12. Multiply and divide proper and improper fractions



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Lesson Script: Timed Drill Intervention

State the purpose of the lesson: (~1 min)

- Today we are going to be working on practicing multiplication facts. First you will practice a few problems. Then you will do a 2 minute multiplication activity. You will graph the number you got correct, and each day you will try to beat the number of problems you got correct.

Directions for Practice Problems (~5-7 min)

- First, you will begin by answering 10 practice problems. When you finish, you can switch papers with your partner. The answers are on the back of the practice problems. If any answers are wrong, cross them out for your partner, and have your partner re-do them. Remind students not to cheat – they are not getting a grade on this.

Timed Drill (~10 min)

- Set the timer for two minutes.
- When I say begin, do your best to answer these math problems. Start here (point to problem in upper left hand corner) and go across the page (demonstrate by moving finger across the page) trying each problem. If you come to a problem you don't know, put an X on it and move onto the next problem. Begin (start timer).
- At the end of the 2 minutes say, Stop.
- Pass out the answer key. Have students check their work with partner, and have them count the total number of correct problems.

Graph Total Problems Correct (~5 min)

- Pull out the graph in your folder. Along the bottom of the chart (left-to-right), is the X-axis, which lists the number of sessions. Point to x-axis. Along the top is the y-axis, which lists the number of problems correct. Point to y-axis. Today is session 1. Find the 1 along the X-axis. Let's say I got 10 problems correct, I would then color-in up to the number 10. Model on document camera.
- After you have graphed the total number of problems correct, you can go back and answer any problems you got incorrect.

Extra Notes

- Make sure the students put the answer key of the practice problems in the back of their folder so they cannot see the answers during the timed drill.
- Make sure students are graphing the total number of problems they got correct. You can have them write the number of problems correct on top of each bar. This might help them try to beat their previous score.

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Timed Drill Student Directions

Practice

- Work on the 10 practice target problems by yourself.
- Review problems with answer key with your partner.
- If they are any incorrect answers, have your partner cross out the incorrect answer and write the correct answer.
- Cover practice problems.

Timed Drill

- Start the problems by yourself when the teacher says begin.
- Stop when the timer stops.
- Use the answer key to check answers. If there are any incorrect answers, have your partner cross out the incorrect answer and you write the correct answer.
- Count the total number of problems correct.
- Graph the total problems correct.

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Lesson Script: Cognitive Strategy Instruction

State the purpose of the lesson: (~1 min)

Today we are going to be working on solving word problems. You will work with your partner to solve problems. First, I will model how to solve the problems using a special checklist, and then and then you will solve the problems with your partner using the checklist. Ask for a student to practice being your partner.

Solve problem using checklist (~5-7 min)

- Read the problem. *Now I will ask myself if I understand the problem. If I don't I will re-read it again.* Model reading the problem again.
- Paraphrase. *Next I can put the problem in my own words. I will explain to my partner what the problem was asking. When I finish solving the problem I need to add a label to my answer, so I can underline what my label for the answer will be.* Model paraphrasing problem with student partner and underlining the word that will be the label.
- Visualize. *Now that I understand the problem, I will draw a picture of the problem.* Show examples of different visualizations such as arrays or objects/groups.
- Hypothesize. *Next I will hypothesize, or make a guess about what numbers need to be multiplied.* State your hypothesis.
- Estimate. *I will estimate, or guess what the answer will be. After I solve the problem, I can look at my estimate to see if I was close. Remember an estimate is just a guess, and it does not have to be the exact answer.* Model estimating.
- Compute. *Now I can go ahead and solve. I also need to add a label.* Model how you would solve the multiplication problem, and how to identify the label. You can demonstrate other strategies such as doubling or skip counting.
- Check. *Lastly, I will check my answer. First I will see if it is close to my estimate. Then I can check my answer using division.* Model how to use division to check answer.

Independent Student Work (~15 min)

- Let students work in dyads. Walk around and assist students as needed. Help students use checklist.

Review answers (~3-5 min)

- Now it is time for us to review the answers to the problems we solve.* Call on students to provide answers.
- Model how to solve each problem using the checklist.

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Cognitive Strategy Instruction Student Instructions

Work with your partner on practicing solving five word problems using the following steps.

Read (for understanding)

- Say: Read the problem. If I don't understand, read it again.
- Ask: Have I read and understood the problem?
- Check: For understanding as I solve the problem.

Paraphrase (your own words)

- Say: Underline the important information. Put the problem in my own words.
- Ask: Have I underlined the important information? What is the question? What am I looking for?
- Check: That the information goes with the question.

Visualize (a picture or diagram)

- Say: Make a drawing or a diagram. Show the relationships among the problem parts.
- Ask: Does the picture fit the problem? Did I show the relationships?
- Check: The picture against the problem information.

Hypothesize (a plan to solve the problem)

- Say: Decide how many steps and operations are needed. Write the operation symbols (+, -, x, and /).
- Ask: If I..., what will I get? If I..., then what do I need to do next? How many steps are needed?
- Check: That the plan makes sense.

Estimate (predict the answer)

- Say: Round the numbers, do the problem in my head, and write the estimate.
- Ask: Did I round up and down? Did I write the estimate?
- Check: That I used the important information.

Compute (do the arithmetic)

- Say: Do the operations in the right order.
- Ask: How does my answer compare with my estimate? Does my answer make sense? Are the decimals or money signs in the right places?
- Check: That all the operations were done in the right places.

Check (make sure everything is right)

- Say: Check the plan to make sure it is right. Check the computation.
- Ask: Have I checked every step? Have I checked the computation? Is my answer right?
- Check: That everything is right. If not, go back. Ask for help if I need it.

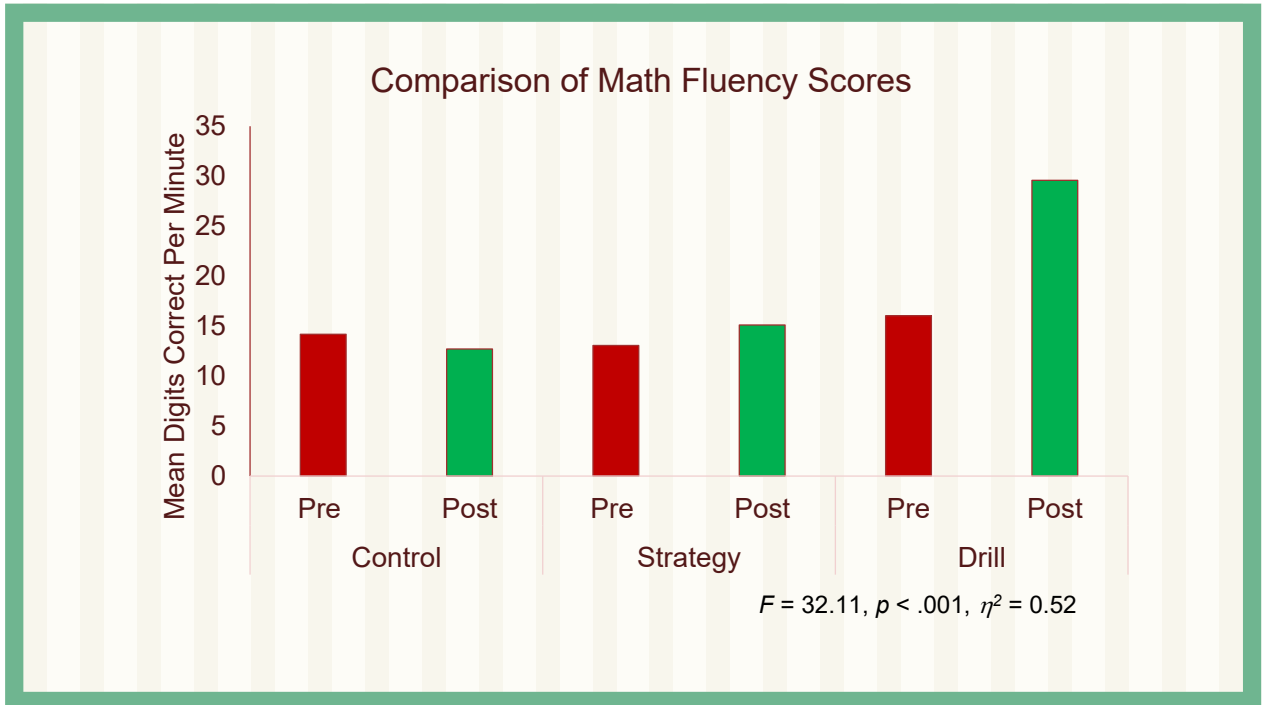
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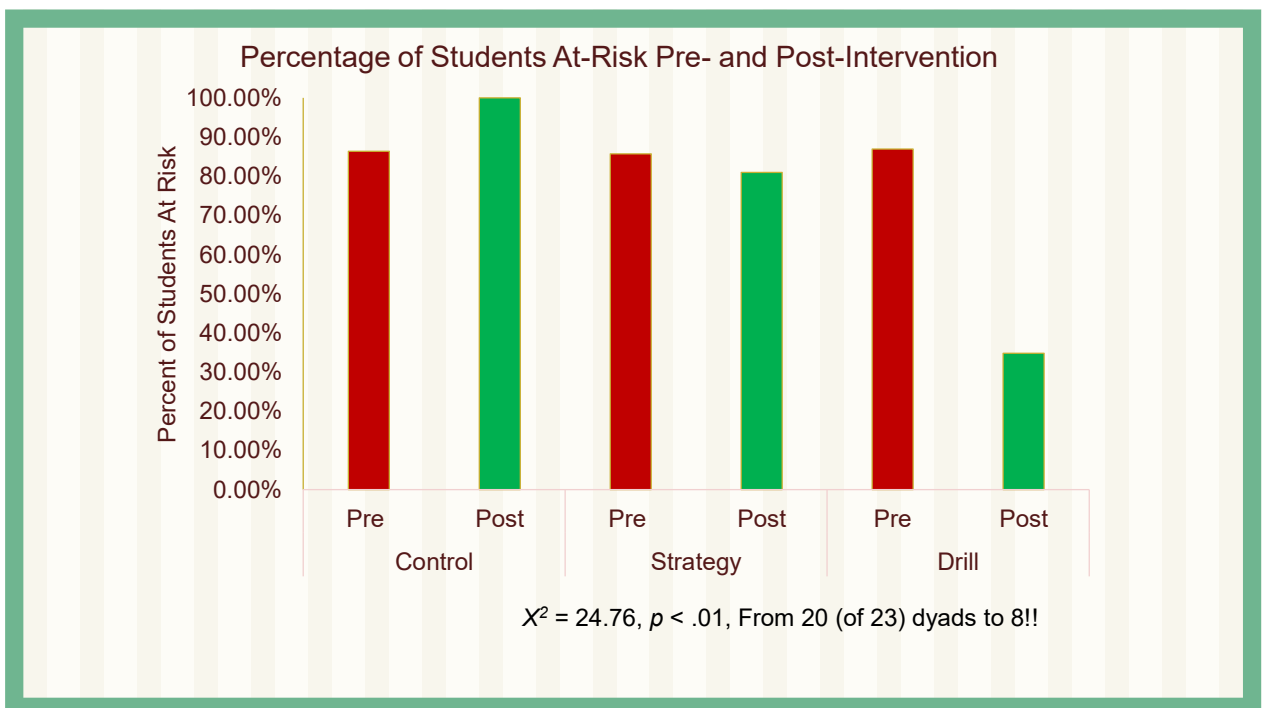
Tech Options

- [Mathfactcafe.com](https://www.mathfactcafe.com)
- [Thatquiz.org](https://www.thatquiz.org)
- [Xtramath.org](https://www.xtramath.org)

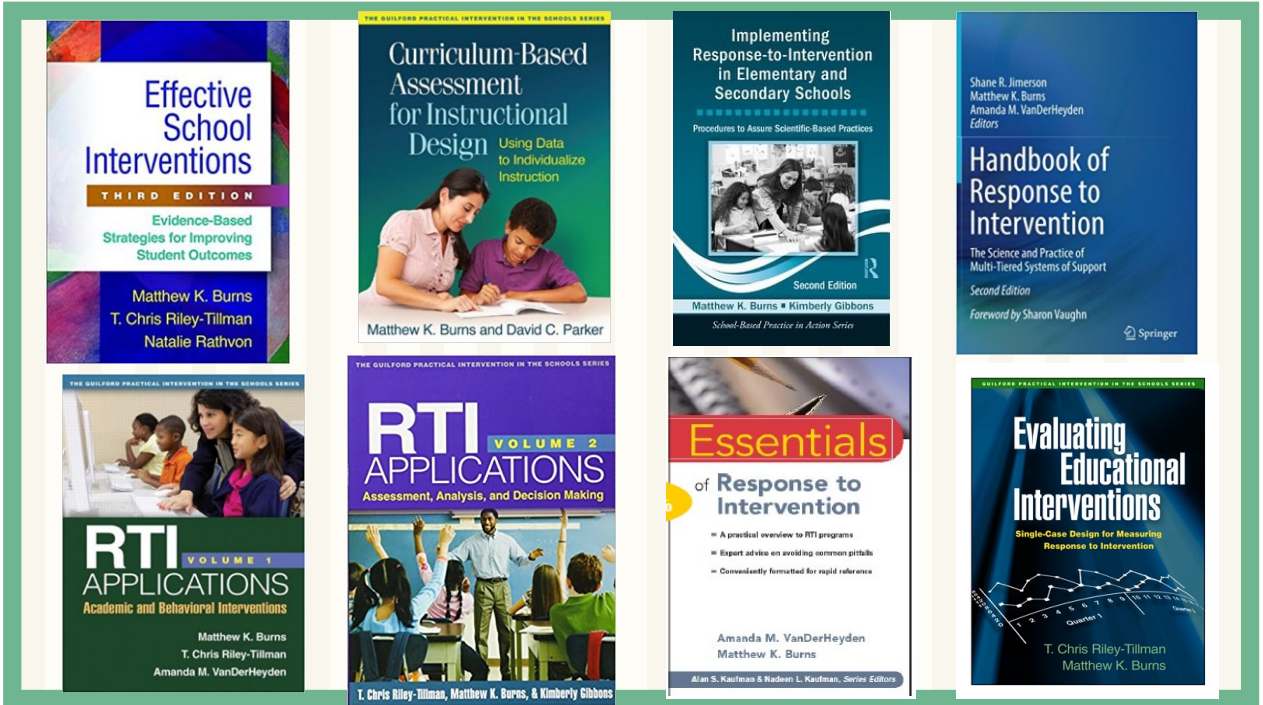
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★ Thanks! ★

Any questions?

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