

Fact Fluency in Action

Rolling Out a Fact Fluency Plan

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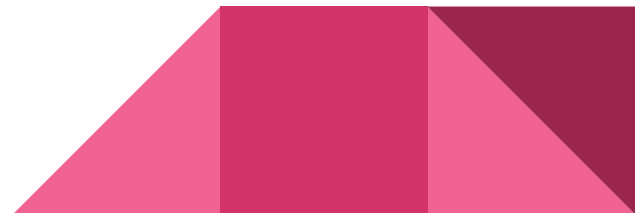


Timed Test - 1 minute

What were you feeling while taking this test?

What would have helped to lessen your anxiety?

How does this relate to a student taking a timed math test?



Let me introduce myself...

Megan King (mking@sdb.k12.wi.us)

Graduated from St. Norbert College in 2001

Master's In Education from Cardinal Stritch University in 2006

Math Intervention Certification from UW-Oshkosh in 2016

School District of Beloit for 11 years



School District of Beloit (SDB) Demographics

6 4K-3rd grade schools, 4 4-8 grade schools, 1 high school, 1 alternative

Diverse population

74% economically disadvantaged



Over 2,400 students at the elementary level

About 175 teachers at the elementary level



Why are we focusing on Fact Fluency in Beloit?

We use Investigations as our core instructional resource.

While strategy instruction is a part of Investigations, basic facts are not an emphasis. There are no assessments for this within Investigations.

Feedback from our Intermediate teachers was that students came to them without knowing basic facts - we decided to start early

Video example of high school students struggling

Common Core/District Essential Learning Targets



Development & Implementation

Math Liaisons created our plan based on:

Fluency Without Fear: Research Evidence on the Best Ways to Learn Math

Facts by Jo Boaler

MMSD resources (Learning Math in the Primary Grades)

Mastering the Basic Math Facts in Addition and Subtraction

By Susan O'Connell and John SanGiovanni

Mastering the Basic Math Facts in Multiplication and Division

By Susan O'Connell and John SanGiovanni



What is the SDB Fact Fluency Plan?

Created the SDB definition of Fact Fluency - the ability to mentally recall the answers to basic math facts automatically and without hesitation (within 4 seconds) = Fluent and Proficient

Students are interviewed individually by teacher to assess needs.

Where do we begin? This took some time this year!

Teachers meet with small groups to give strategy instruction, while students are reinforcing their learning at their readiness level.

Interviews happen 4 times throughout the year (except K).



Fact Fluency Continuum

Level 0 Addition (within 5)

Level 1 Addition (+1, +2, +0)
Students can work

Level 2 Addition (Doubles, Doubles +1, Varied)
within different

flexibly

Level 0 Subtraction (within 5)
levels, depending on

Level 1 Subtraction (-1, -2, -0)
readiness!

Level 2 Subtraction (Doubles, Doubles -1, Varied)

Multiplication (Varied)



Student Sheet

Addition Level 0 (within 5)

Proficiency is 8+/10

Student gets a copy of this

No pencil

“We are going to talk about your math thinking today. Look at each equation. Please tell me the answer.”

**** LEVEL 0 Addition Student Sheet ****

Reusable - Do NOT write on

$1+1=$ _____

$2+3=$ _____

$2+2=$ _____

$2+0=$ _____

$1+2=$ _____

$5+0=$ _____

$3+1=$ _____

$3+2=$ _____

$4+1=$ _____

$0+3=$ _____

Addition Level 1

**** LEVEL 1 Addition Student Sheet ****

Reusable - Do NOT write on

Proficiency is 24+/30

$2+1=$ _____

$2+2=$ _____

$4+0=$ _____

$1+4=$ _____

$3+2=$ _____

$0+9=$ _____

$6+1=$ _____

$5+2=$ _____

$7+0=$ _____

$1+9=$ _____

$2+4=$ _____

$0+8=$ _____

$8+1=$ _____

$1+2=$ _____

$2+0=$ _____

$10+1=$ _____

$12+2=$ _____

$14+0=$ _____

$1+12=$ _____

$15+2=$ _____

$12+0=$ _____

$1+15=$ _____

$2+13=$ _____

$0+13=$ _____

$16+1=$ _____

$2+17=$ _____

$19+0=$ _____

$1+19=$ _____

$14+2=$ _____

$0+16=$ _____


During the Interviews...

Students are not aware that teacher is monitoring the amount of time it takes to answer.

Teachers are coding how the student answers the number sentence.

This will help with small group strategy instruction.

Teachers ask questions: “What are you doing? What strategy did you use to solve that? What does your thinking sound like? I want to learn about your math thinking!”



Teacher Recording Sheet - Addition Level 0

Teacher records student responses

Teacher uses coding system

Use proficiencies to determine student's level of readiness

Date					Date				
1 + 1 =					2 + 3 =				
2 + 2 =					2 + 0 =				
1 + 2 =					5 + 0 =				
3 + 1 =					3 + 2 =				
4 + 1 =					0 + 3 =				

Coding:

- ce**-counted everything
- sb**-showed both sets, doesn't count all
- f**-used fingers to count on
- c**-counted on
- dot after answer**-used thinking time
- line above answer**-incorrect

Addition and Subtraction Proficiencies:

- 8 / 10 - Fluent and proficient. Students can move on to next level.
- 5-7 / 10 - Basic (considered "instructional" level)
- 0-4 / 10 - Minimal

Scoring:

Baseline	September	Score ____/10
First Assessment	December	Score ____/10
Second Assessment	March	Score ____/10
Third Assessment	May	Score ____/10

Teacher Recording Sheet - Addition Level 1

Level 1 - Addition Fact Fluency Teacher Recording Sheet

Name: _____

Date					Date					Date				
+1					+2					+0				
2 + 1 =					2 + 2 =					4 + 0 =				
1 + 4 =					3 + 2 =					0 + 9 =				
6 + 1 =					5 + 2 =					7 + 0 =				
1 + 9 =					2 + 4 =					0 + 8 =				
8 + 1 =					1 + 2 =					2 + 0 =				
10 + 1 =					12 + 2 =					14 + 0 =				
1 + 12 =					15 + 2 =					12 + 0 =				
1 + 15 =					2 + 13 =					0 + 13 =				
16 + 1 =					2 + 17 =					19 + 0 =				
1 + 19 =					14 + 2 =					0 + 16 =				

Coding:

ce-counted everything

sb-showed both sets, doesn't count all

f-used fingers to count on

c-counted on

dot after answer-used thinking time

line above answer-incorrect

Addition and Subtraction Proficiencies:

24+ / 30 - Fluent and proficient. Students can move on to next level.

15-23 / 30 - Basic (considered "instructional" level)

0-14 / 30 - Minimal (assess previous level)

Scoring:

Baseline September Score _____/30

First Assessment December Score _____/30

Second Assessment March Score _____/30

Third Assessment May Score _____/30

Coding

This was difficult at the beginning of the year; teacher capacity increased as value became apparent.

ce - counted everything (Ex. puts up fingers for each number and counts total)

sb - showed both sets, knows answer without counting (Ex. puts up group of fingers for each number, but does not count total)

f - used fingers to count on from (Ex. counts on from one number, puts up fingers to track counting)

c - counted on from (Ex. counts on from one numbers, might tap, nod, or mouth counting)

dot - after sum - used thinking time (> than 4 seconds)

line - above sum (incorrect)

blank - if no answer given or says “don’t know”

[Addition Interview Example](#)



Strategy Instruction

This is when the student learns about the most efficient strategies they can use to solve the number sentences.

This is done by the teacher during Guided Math.

Small groups with similar needs are grouped together.

[Doubles Strategy Instruction - Mrs. Gile](#)



Independent Practice

This is when the student reinforces understanding of strategies used to solve number sentences; students should be practicing at their “instructional level.”

This is done independently, with a partner, or with a small group

This is done during Guided Math.

[Kindergarten Independent Example](#)

[1st Grade Independent Example](#)

[2nd Grade Independent Example](#)



Resources

[Fact Fluency Strategies & Activities Document](#) - created by teachers at PD

Investigations games

Xtra Math - without a timer; can be set to work on specific number groups

[Addition Fact Cards](#) - within the [Mastering Basic Facts](#) book



Use of Data

Addition 0	Addition 0	Addition 0	Addition 0	Addition 1	Addition 1	Addition 1	Addition 1	Addition 2	Addition 2	Addition 2	Addition 2
Sept.	Dec.	March		Sept.	Dec.	March		Sept.	Dec.	March	
2	0	1									
1	6	8				23					
0	1	1									
0	10				22	23					
2	8				21	23					
10				26				8	20		
3	8				22	24				10	
4	9				28				15	19	
6	8				22	23					
2	2	5									
9				6	13	28					18
8				21	27				22	23	
7	10				28				21	22	
3	10				25				11	17	
2	5	24				9					
8				26				3	12	17	
6	8				21	26				15	
5	8				23	24				9	

Flexibly Grouping Students

Teachers use data to make instructional groups as well as independent practice groups

Group like students together

ADDITION FACT FLUENCY

Level 0

Addition within 5

Level 1

+1

+2

+0

Level 2

Doubles

Doubles + 1

Varied

How did we get teacher support?

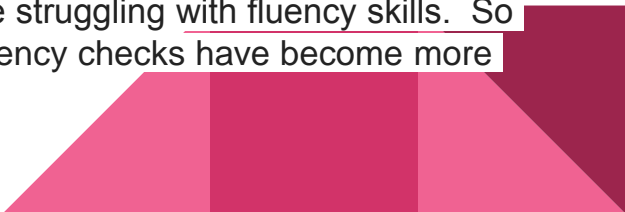
Beginning of the school year, I attended a staff meeting at each building to explain the process to teachers

Volunteered to help teachers - let them know I was there for support

Gave them all materials that were needed - no need to search for resources

“We talked to the teachers about how students always come to us lacking the number sense from the prior year. Fact Fluency and its activities are the answer that we’ve been looking for... The teachers were excited to know that there was something to help them with this process, and they didn’t have to solve it on their own.”

“Teachers responded well because they saw the need and knew students were struggling with fluency skills. So many teachers had no other way to test fluency other than timed tests. Our fluency checks have become more efficient as they year went on.”



Is Fact Fluency working for SDB?

“My students are truly understanding multiplication. Last year, we didn’t get to multiplication until Unit 5 (around December), so most students were afraid to explore multiplication. This year, I had students quickly jump into multiplication after they learned their doubles. Some even started this in September!” - Becky Ryan (3rd grade teacher)



Data Examples

Addition 0	Addition 0	Addition 0	Addition 0	Addition 1	Addition 1	Addition 1	Addition 1	Addition 2	Addition 2	Addition 2	Addition 2
Sept. '15	Dec. '15	Mar '16		Sept. '15	Dec. '15	Mar '16		Sept. '15	Dec. '15	Mar '16	
10				21	27			15	22	24	
10				24				12	16	20	
9				24				17	26	25	
8				20	26			3	14	10	
3	6	10		too hard		23		too hard			
10				23				17	27	27	
10				23	30			14	26	27	
				22	27			14	21	23	
				25				10	16	20	
6				13	25			7		13	
7				43				too hard			
7				19	27			8	16	19	
4				44	49			too hard			
								23	26	27	
8				14	27				13	16	
					24				14	20	
					25				25	moved	

Future Plans after Reflection of Teacher Leaders

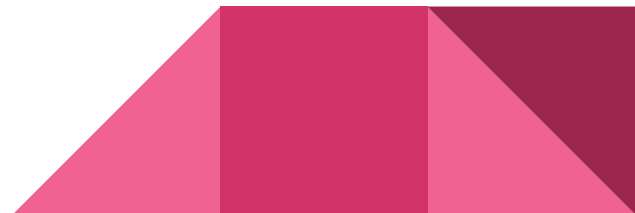
Edit the instructional progressions based on resource books

End of Year Reporting to be given to next year's teachers

Kindergarten - Adding a Number Sense Assessment before students start Fact Fluency (Number Sense book)

Ongoing professional development

Continue to look at multiple data sources throughout the next few years to get a better idea of progress



Questions???

Please feel free to contact me via email at
mking@sdb.k12.wi.us

THANK YOU for attending today's session!

