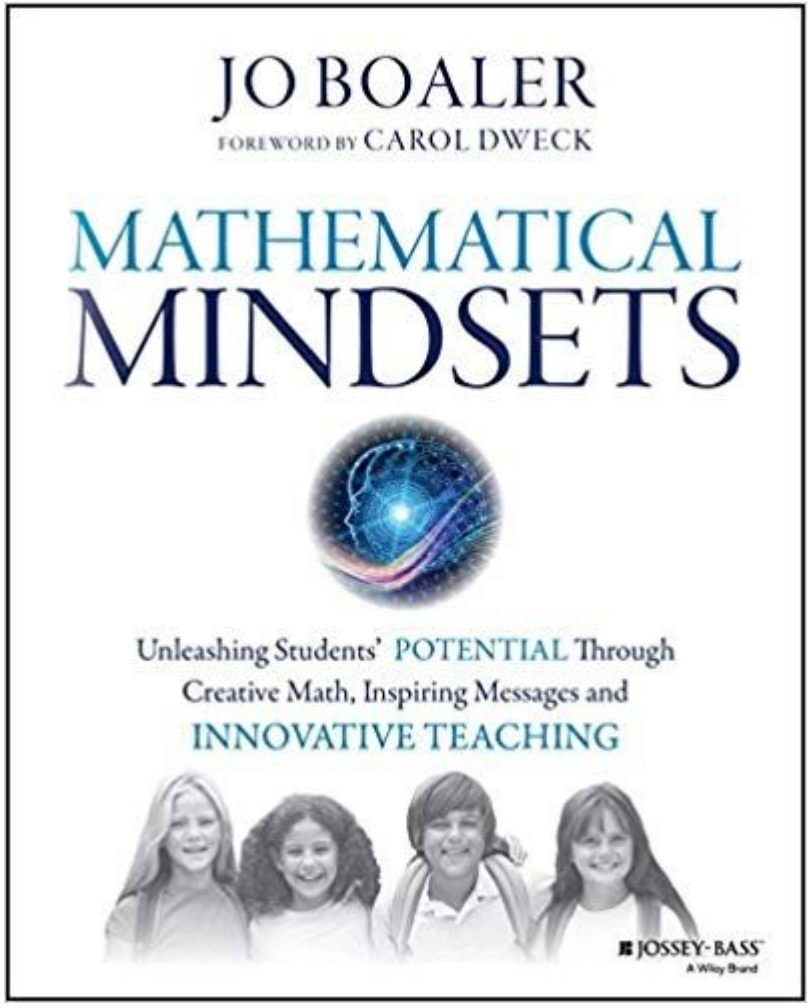
Mathematics

Building Blocks for a Strategic Approach to Improving Outcomes

What's the problem with math?

Persistent and indefensible differences in achievement and participation for students of different ethnicities, genders, socioeconomic status nationwide (Lee, 2002).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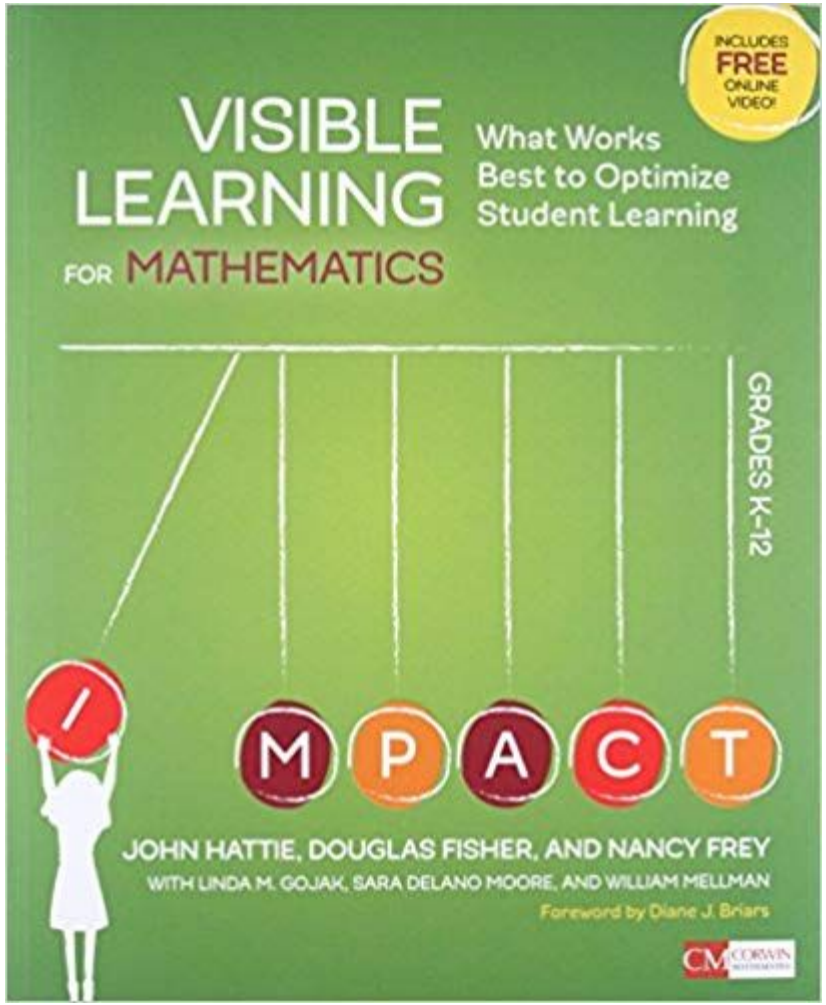
Unleashing Students' POTENTIAL Through Creative Math, Inspiring Messages and INNOVATIVE TEACHING
JOSSEY-BASS
A Wiley Brand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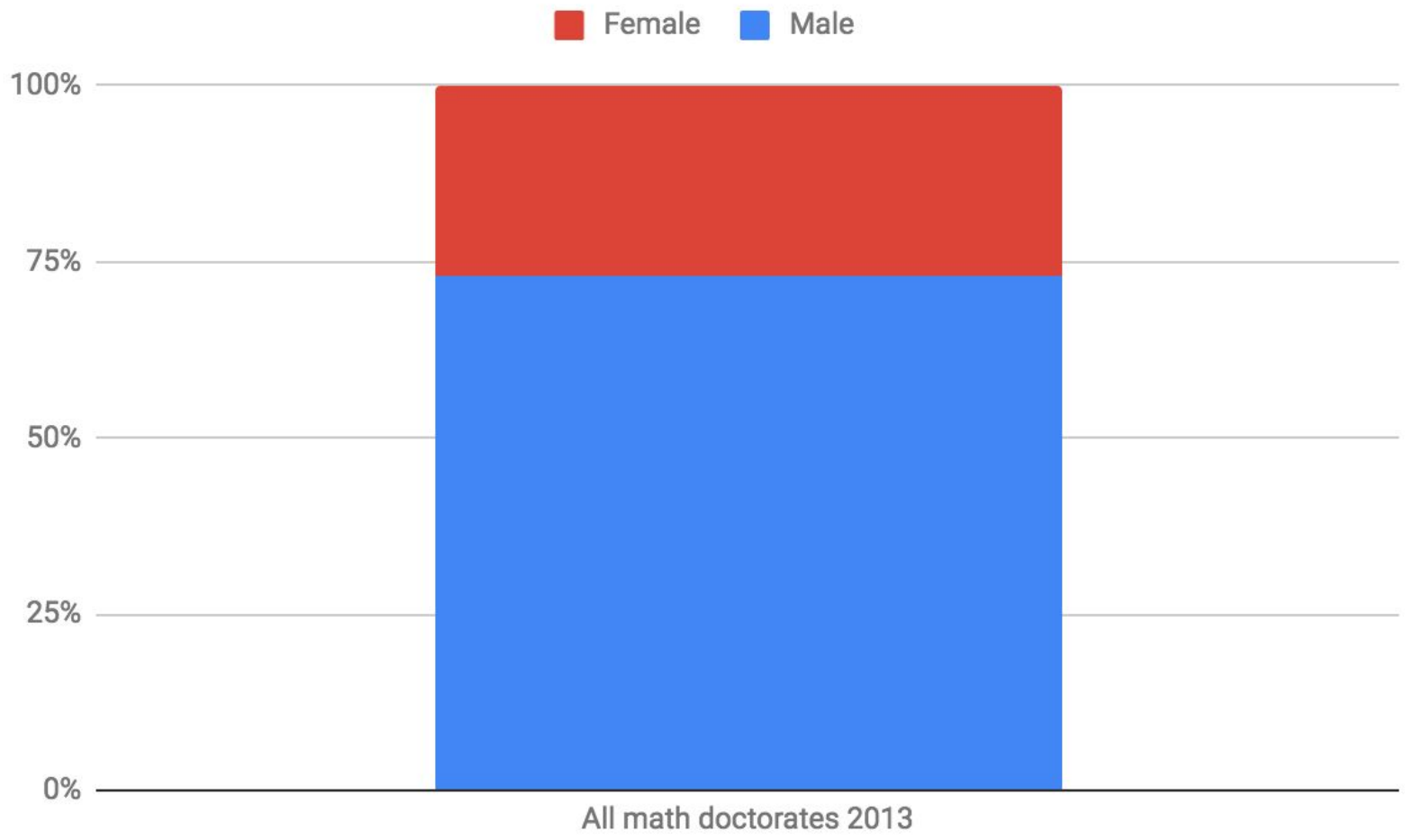
VISIBLE LEARNING FOR MATHEMATICS
What Works Best to Optimize Student Learning
GRADES K–12
M P A C T
JOHN HATTIE, DOUGLAS FISHER, AND NANCY FREY
WITH LINDA M. GOJAK, SARA DELANO MOORE, AND WILLIAM MELLMAN
Foreword by Diane J. Briars
CORWIN

An Elitist Construction?

- High historical D/F rates- sorting for the stars
- Myths of the mathematically gifted child
- Held up as being harder than other subjects and therefore suitable for an elite subset of kids

ELITIST IDEAS + STEREOTYPES = INEQUITIES


Female
Male
100%
75%
50%
25%
0%
All math doctorates 2013

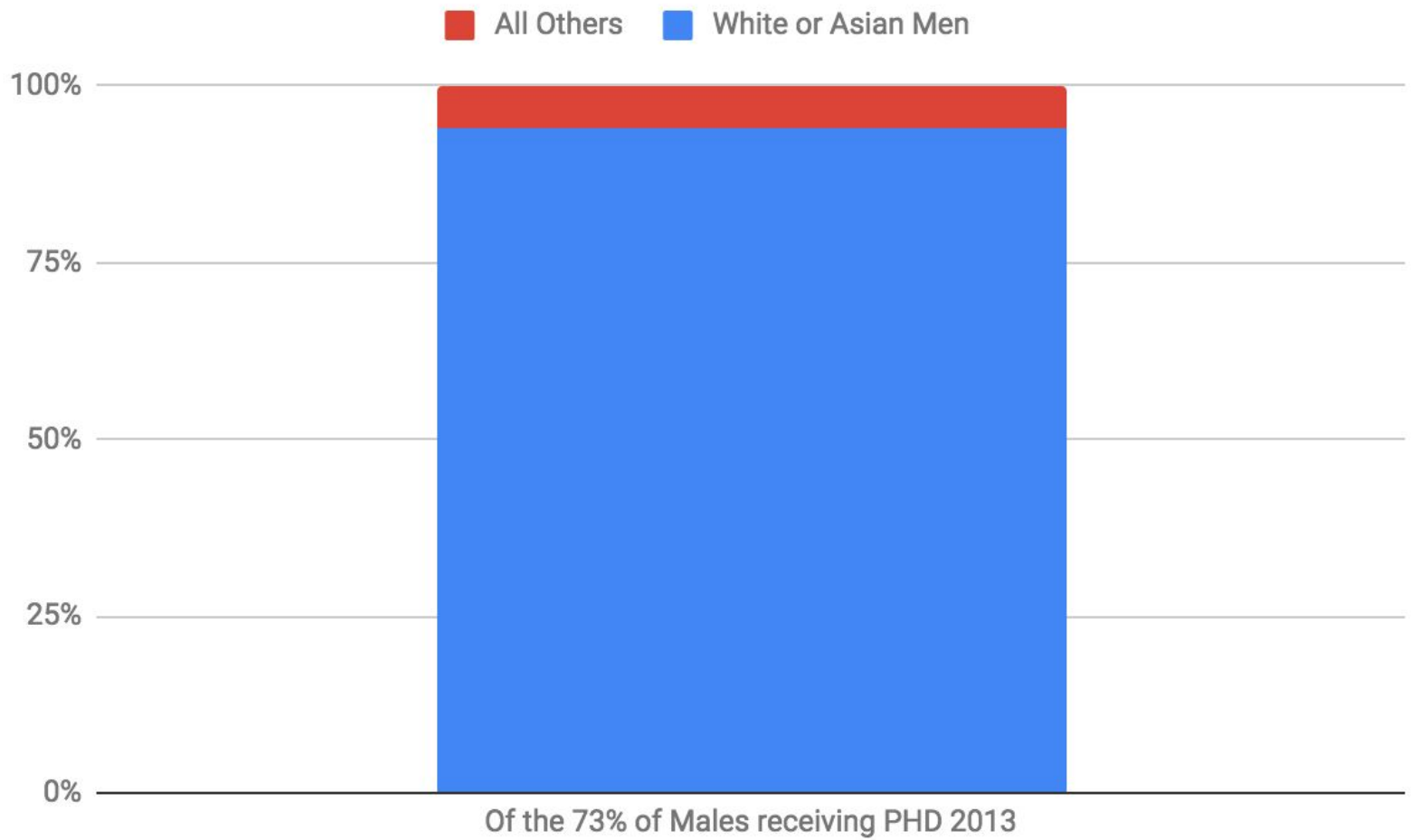

All Others
White or Asian Men
100%
75%
50%
25%
0%
Of the 73% of Males receiving PHD 2013

Table 1: SBA Performance by grade level: Percent Proficient

- **Colors represent student group progression**. This is NOT a cohort study and includes all students tested.

Grade	2015 Percent Proficient	2016 Percent Proficient	2017 Percent Proficient	2018 Percent Proficient
3	61	70	65	70
4	58	58	59	55
5	55	57	54	55
6	52	62	60	58
7	50	57	59	62
8	55	49	59	62
11	43	50	41	54

Local Assessments:

Table 6: Elementary: Percent of Students Proficient (ASOU)

Note: This is not cohort data but a snapshot of a single year.

2017-2018	T1 Percent Proficient				T2 Percent Proficient				T3 Percent Proficient			
Grade	**All**	**ASI 0-2**	**ASI 3+**	**AFAM**	**All**	**ASI 0-2**	**ASI 3+**	**AFAM**	**All**	**ASI 0-2**	**ASI 3+**	**AFAM**
k	91.0	97.5	79.0	80.5	89.1	94.2	79.1	82.1	95.8	99.7	89.6	89.0
1	92.9	99.5	81.7	72.6	89.1	96.5	76.0	67.9	88.9	96.3	75.1	62.2
2	84.0	93.1	70.2	70.1	86.9	94.7	74.2	71.1	89.7	95.5	81.9	78.2
3	86.1	96.3	70.6	64.5	73.3	87.4	51.6	41.1	81.8	93.8	63.0	45.2
4	80.8	95.5	60.9	56.8	79.5	93.3	60.7	58.3	70.0	88.7	45.0	36.2
5	78.7	93.7	56.8	40.2	78.4	91.7	58.9	41.8	62.1	78.3	38.6	27.6
Change	***-12.3***	***-3.8***	***-22.2***	***-40.3***	***-10.7***	***-2.5***	***-20.3***	***-40***	***-33.7***	***-21.4***	***-51.0***	***-61.4***

Does SBA predict 9th grade Math 1 performance?:

SBA Performance level at the end of 6th grade as a predictor of 9th grade Semester 2 final grades

6th Grade SBA Math PL	F	D	C	B	A	Total	DF Rate	C or Higher Rate
1	26	32	16	13	1	88	65.9%	34.1%
2	7	14	42	40	27	130	16.2%	83.8%
3	2	3	23	41	63	132	3.8%	96.2%
4		2	7	19	73	101	2.0%	98.0%
Total	35	51	88	113	164	451	19.1%	80.9%

Math 1: Percent grades C and Higher (2018-19)

Grade	All		ASI 0-2		ASI 3+		AFAM	
	n	Percent	n	Percent	n	Percent	n	Percent
9	635	80.9% -0.4%	382	92.1% -1.8%	257	63.8% +0.4%	87	53.4% +9.7%
10	144	47.9% +7.9%	28	78.6% +28.6%	116	40.5% +3.1%	43	32.6% +8.3%
11	31	48.4% +6.7%	2	0.0% -33.3%	29	51.7% +8.8%	10	30.0% +5%
12	10	60.0% -3.6%	1	100.0%	9	55.6% -4.4%	1	100.0%

n=Total Enrollment

By David Stevens

What have we done?
What do we do now?

	RECENT INVESTMENTS	15-16	16-17	17-18	3 year total cost
	MATHEMATICS				
1	K-5 Ongoing Materials and Printing Costs	80,000	80,000	80,000	**240,000**
2	6-8 Ongoing Materials and Printing Costs	80,000	80,000	80,000	**240,000**
3	9-12 Materials and Printing Costs	28,000	28,000	27,000	**83,000**
4	K-8 Curriculum Supports, Enhancements (Eureka online)	56,000	56,000	56,000	**168,000**
5	Elementary Math Coaching 1.0 (LCAP)	93,000	93,000	93,000	**279,000**
6	Middle and High Math Coaching 1.0 (LCAP)		60,000	60,000	**120,000**
7	High School Math Coaching .6 (LCAP)		36,000	36,000	**72,000**
8	Silicon Valley Math Initiative Membership	5,000	5,000	5,000	**15,000**
9	High School Math Design Collaborative	200,000	200,000	200,000	**600,000**
10	Elementary Math PD	10,000	15,000	15,000	**45,000**
11	Middle School Math Class Size Reduction	150,000	150,000		**150,000**
12	Middle School Math PD	10,000	25,000	25,000	**60,000**
13	K-5 Math Teacher Leaders (2027 stipend x11) BSEP	22,000	22,000	22,000	**66,000**
14	6-8 Math Teacher Leaders (2027 stipend x4) BSEP	8,108	8,108	8,108	**24,324**
15	**MATH TOTALS**	**375,000**	**395,000**	**245,000**	**1,015,000**

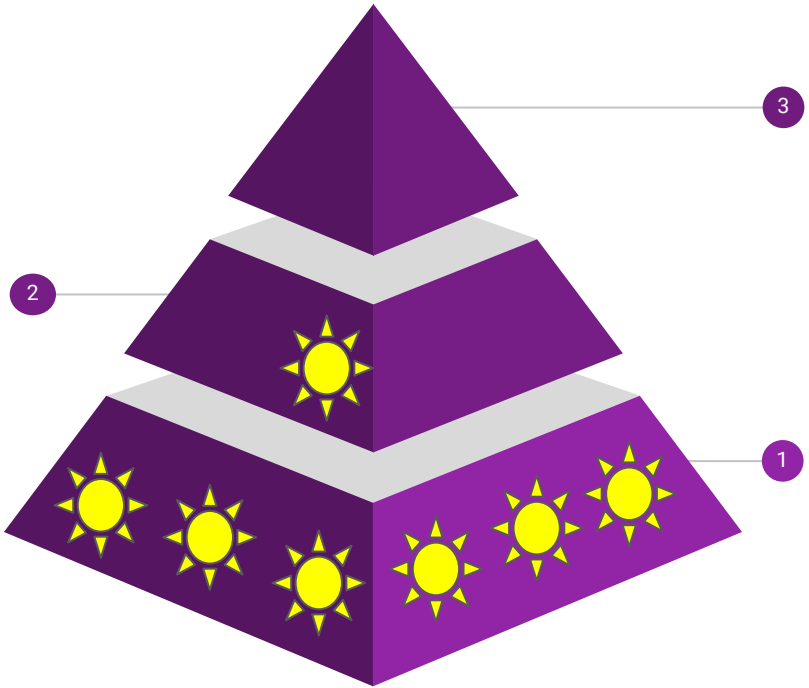
Middle School Math Support Classes

Summary: Middle school Math Support classes are contributing to accelerated rates of growth in math performance.

- **Evidence: 2018-19 Fall Star Math vs. Winter Star Math**
  - During the first half of the current school year, students in a Math Support (n=202) grew an average of 0.77 years (compared to expected half year growth of 0.50)
  - This accelerated rate of growth was 54% above the expected change.

- **Evidence: SBA Math Distance From Met: Changes from year to year (2017 to 2018):**
  - 8th grade SBA Math performance is a very strong predictor of 9th grade Math 1 grades and final exam performance.
  - 97% (263/270) of students who scored proficient on SBA Math in 8th grade had a C or better first semester in Math 1 in 9th grade.
  - Students in Math Support last year (n=227) improved their SBA scores at a rate five times higher than those not in support classes. (+22 pts vs. +4 pts)
  - Math Support classes in middle school can have a direct impact on Math 1 student performance.

- **Smaller group instruction**
- **Adaptive and personalized skill building and practice**

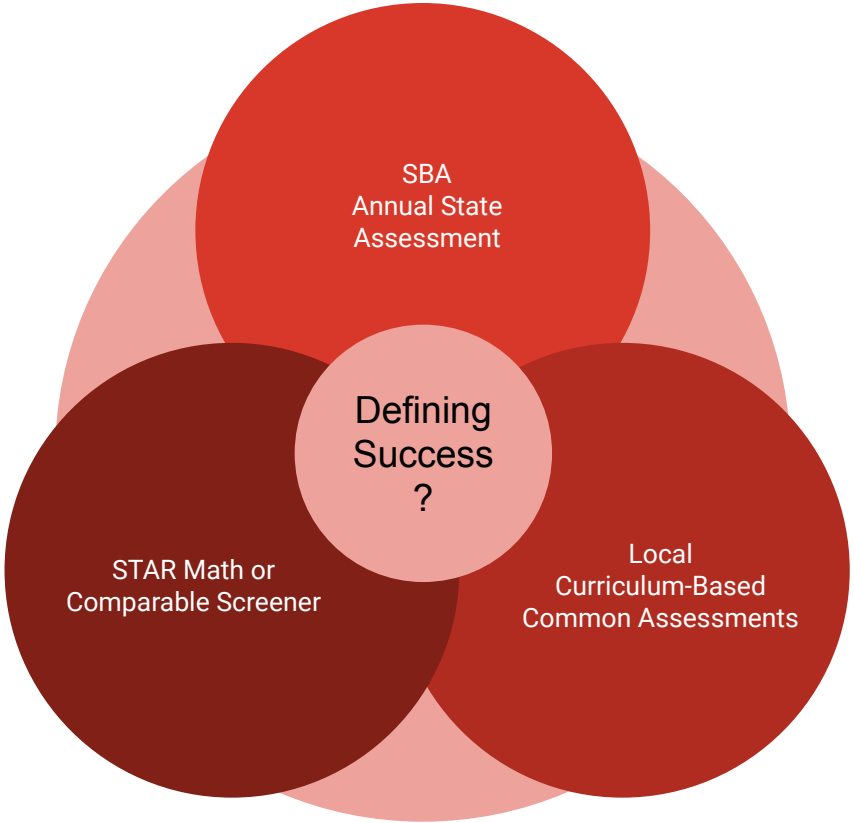


Individualized student support

- **Curriculum Review**
- **Instructional Time K-5**
- **Student Math Identity**
- **Teacher Capacity/Math Identity**
- **Instructional design**

Math Support Classes and Math Visioning

The Beginning of Good Data Is the Definition of Terms



Too often stakeholders use the same metric terms but ascribe different values to them.

1. Define Success at each level

Common metrics with shared value

Assess to observe growth as well as proficiency

2. Change ideas about who can achieve in math EARLY AND OFTEN

3. Curriculum review K-12

Would having a K-12 adoption and format help?

4. Must have scope and sequence and common assessments

Keep instruction performance and goal oriented

Common assessments should be externally validated and non-negotiable once aligned to scope and sequence

5. Assess movement from purely procedural instruction to depth and engagement

Hands on

Project-based

Real life applications

What can CTE movement do to inform mathematics?

6. Classrooms as opportunity structures vs. systemic barriers

Homework questions

Flipped classrooms- deliverables and practice happen with peer and expert support

7. Revisit convergent research on the elements of effective tier 1 instruction

New info in small chunks

Checks for understanding and guided practice

Address common patterns of confusion

8. Prioritize PD to address Math Identity or Math Empathy

9. Direct student feedback through survey and evaluation

Feedback from kids to teachers can be more effective driver of change in practice than formal evaluations

10. More effective and aligned use of summer and afterschool spaces

Adaptive tech for basic and discrete skills gaps

11. Adaptive technology universalized to remediate basic math skills gaps

12. Review role of Academic Language in math classrooms