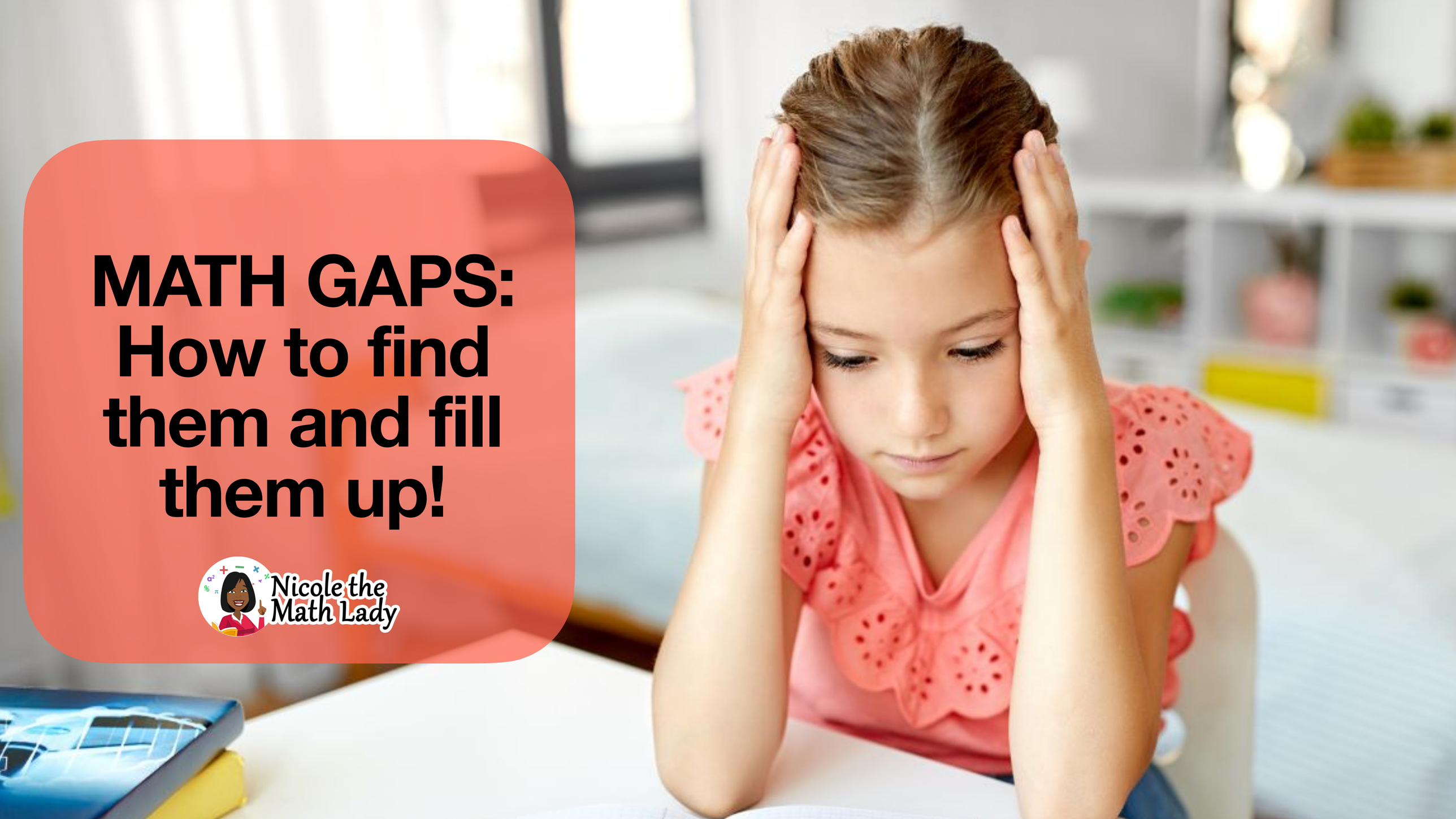
MATH GAPS: How to find them and fill them up!

Nicole the Math Lady



What is a math gap?

- A math learning gap refers to any math skill that a student should have previously mastered, but didn’t.

Why are math gaps a problem?

The nature of math

Calculus

Trigonometry

Exponential Algebra

Geometry

Linear Algebra

Pre-Algebra

Arithmetic

Where do we need multiplication?

- Factors/Greatest Common Factor
- Multiples/Least Common Multiple
- Common denominator
- Simplifying Fractions
- Converting Mixed Numbers to Improper Fractions
- Equivalent Fractions
- Multiplying Fractions
- Dividing Fractions
- Measurement Conversions
- Roots
- Decimals
- Proportions
- Percents
- Rates
- Exponents and Square Roots


HELP

What’s Missing?

Automaticity

Automaticity is the ability to deliver a correct answer immediately from memory without conscious thought, as opposed to relying on calculation.

- Stickney et al. (2012)

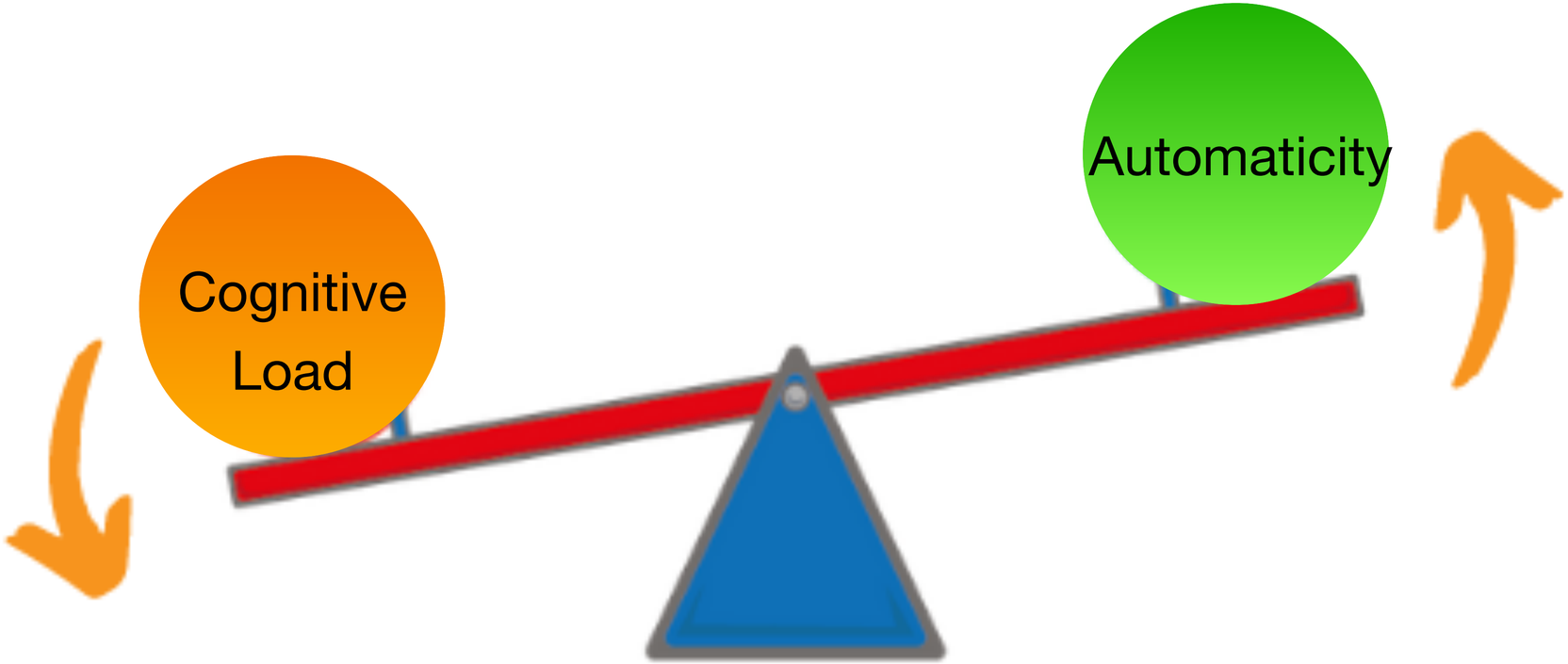
Automaticity

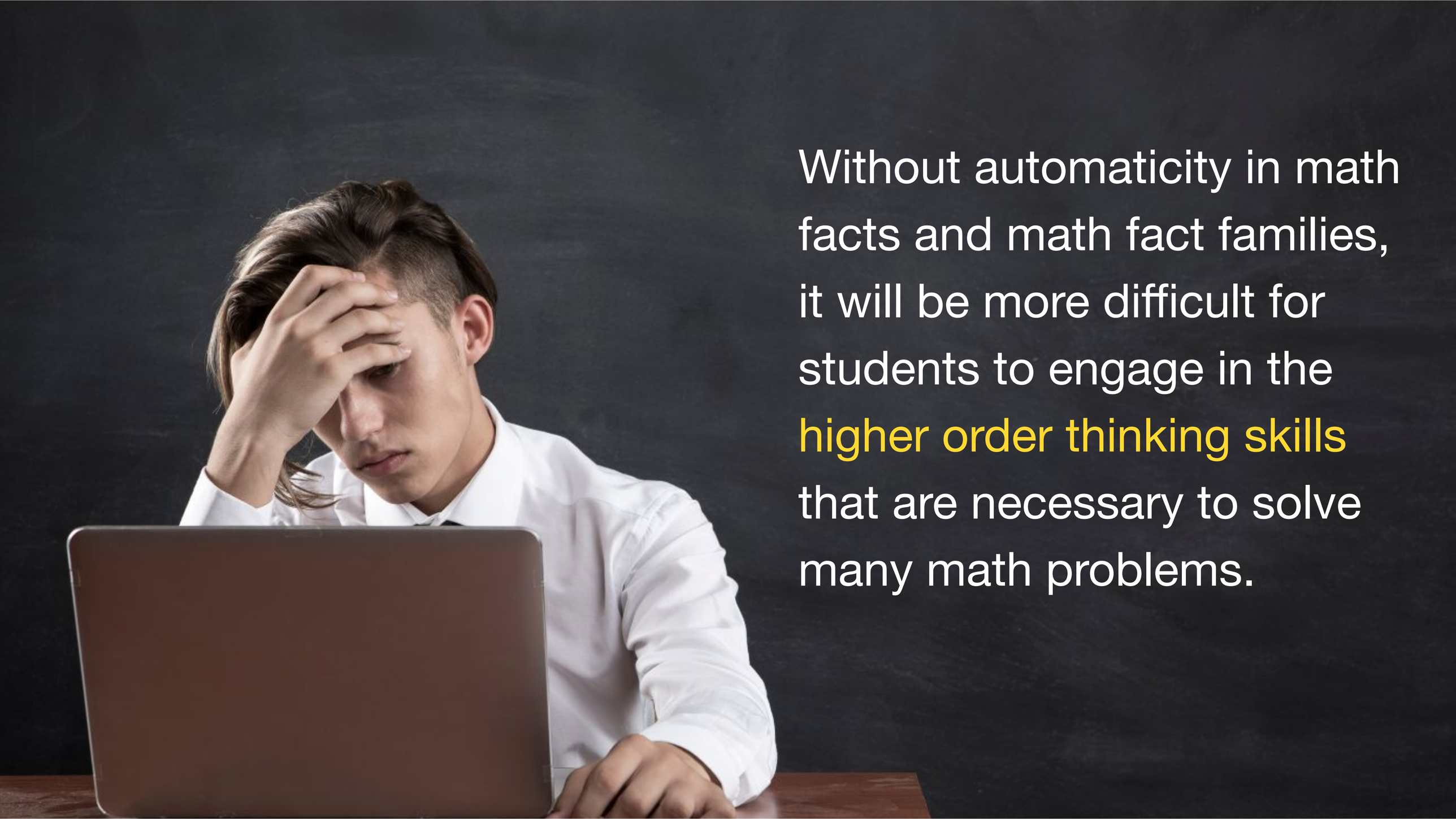
Examples

- Instantly knowing that **7 + 8 = 15** without counting on fingers.
- Quickly recalling multiplication facts like **6 × 7 = 42** without pausing.
- Recognizing that **100 ÷ 25 = 4** immediately.

Why It Matters

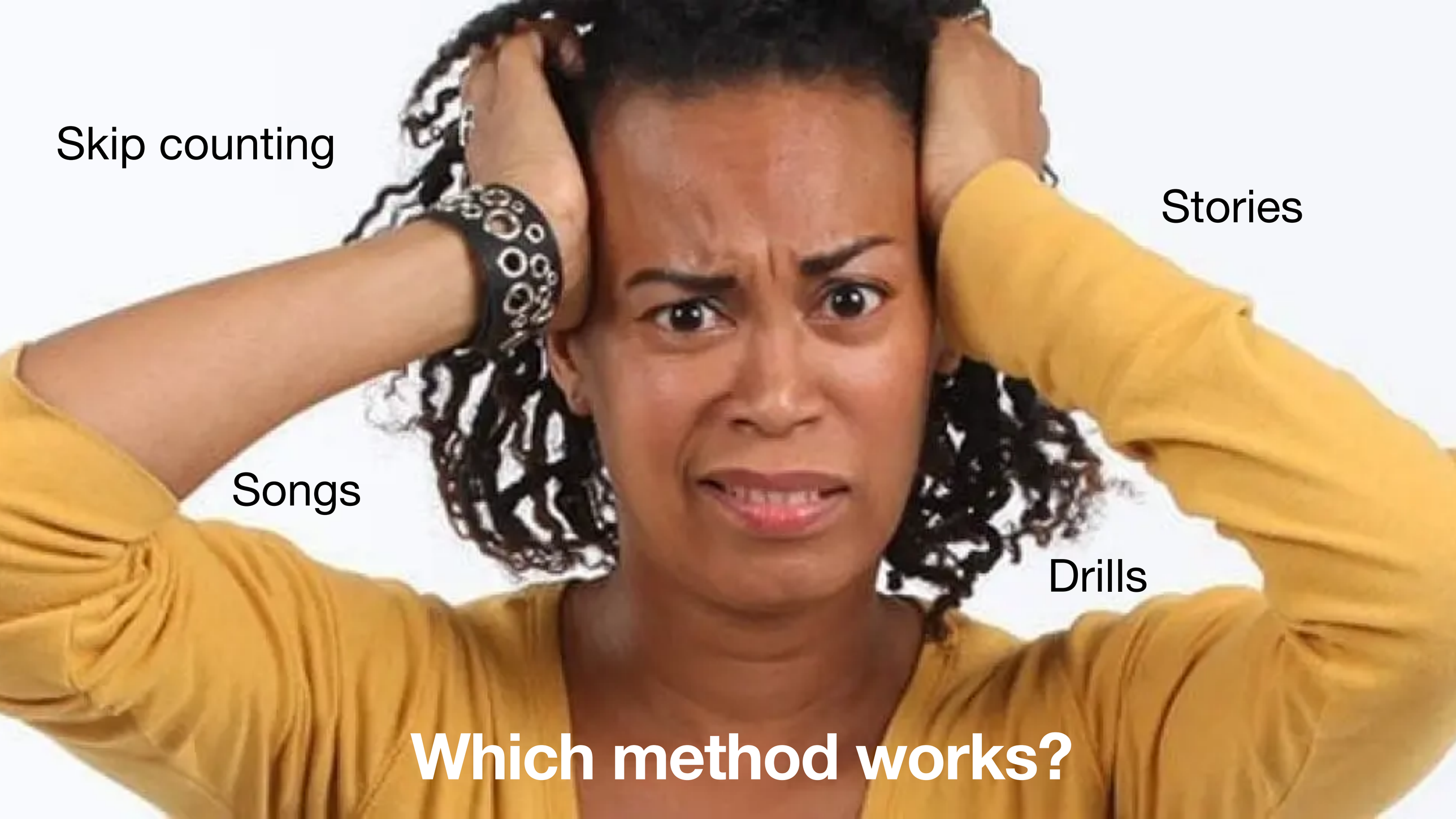
- Frees up working memory for solving more complex problems.
- Helps with speed and efficiency in math tasks.
- Reduces frustration and mental fatigue.





Without automaticity in math facts and math fact families, it will be more difficult for students to engage in the higher order thinking skills that are necessary to solve many math problems.

Where do math gaps occur?

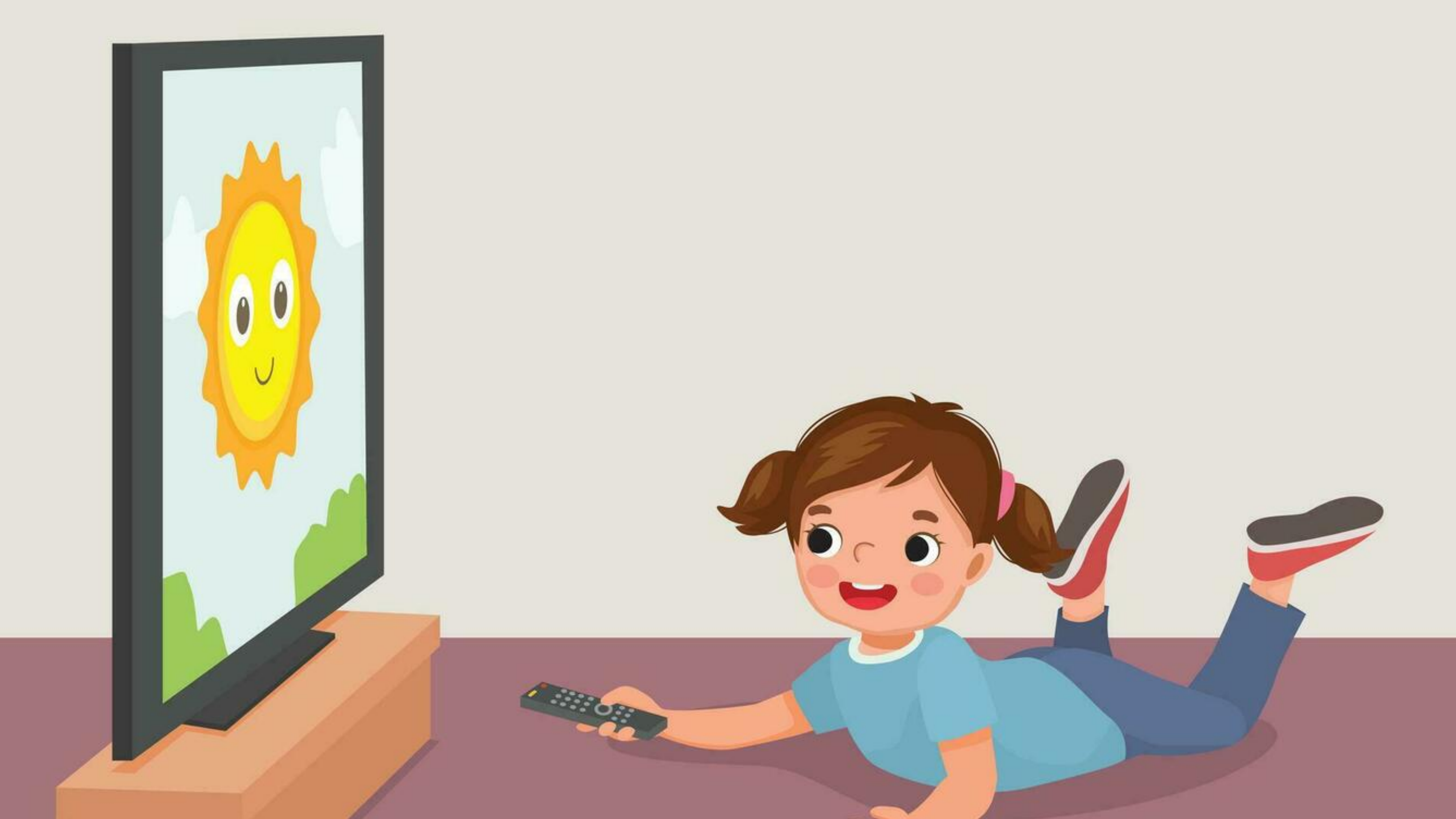

Skip counting
Stories
Songs
Drills
Which method works?

The research shows….

It
All
Works

So find something your kids will enjoy!

It’s not the what, it’s the HOW!



We need intentional, targeted practice to reinforce these foundations and fill the math gaps.

To gain automaticity, take…

S I D E S

Speak it

The Production Effect

The dual action of speaking and hearing oneself has the most beneficial impact on long-term memory.

- The University of Waterloo

S

I

D

E

S

Speak it

Interesting/Active

S

Speak it

I

Interesting/Active

D

Dedicate Time

E

S


hello
Summer


15

Speak it

Interesting/Active

Dedicate Time

Easy Ones First

Recommended order for Teaching Addition Facts

- Doubles (Dark Orange)
- Sums of 10 (Dark Green)
- 10 Plus (Dark Blue)
- Plus 0 (Dark Purple)

+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

Recommended order for Teaching Multiplication Facts

- Times 0 (Dark Purple)
- Times 1 (Dark Purple)
- Times 2 (Dark Green)
- Times 10 (Dark Red)

X	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100

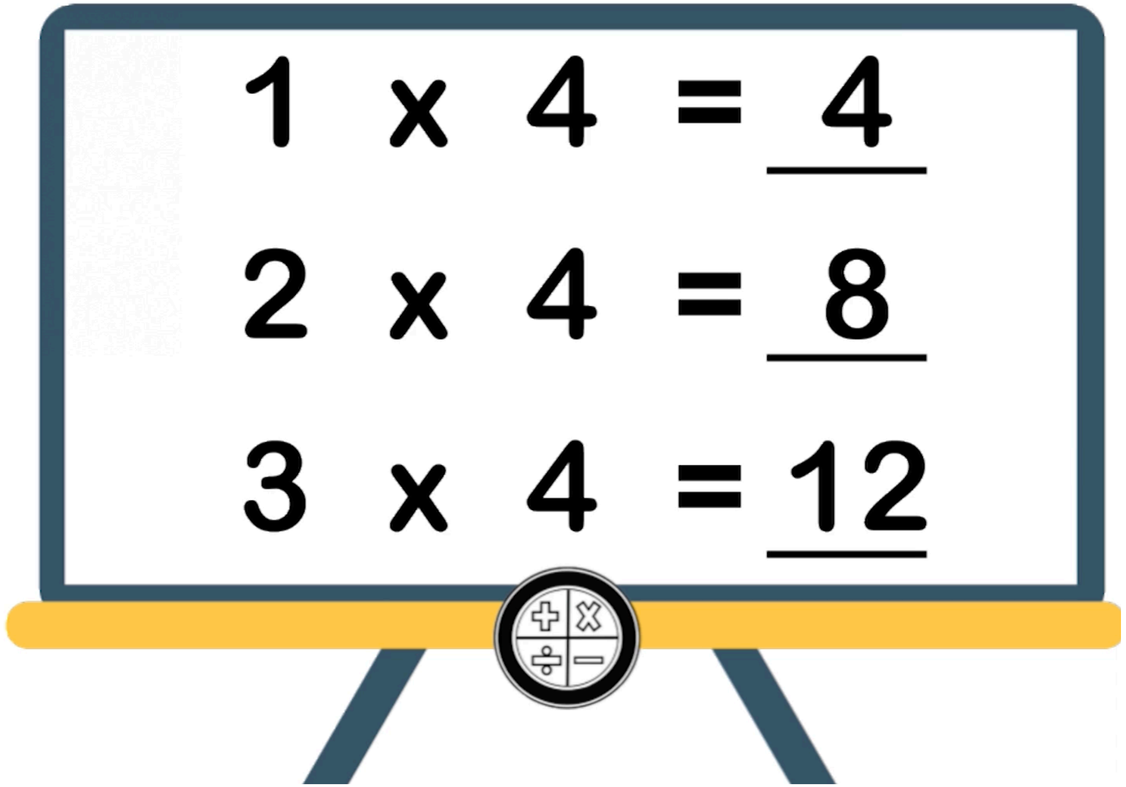
Speak it

Interesting/Active

Dedicate Time

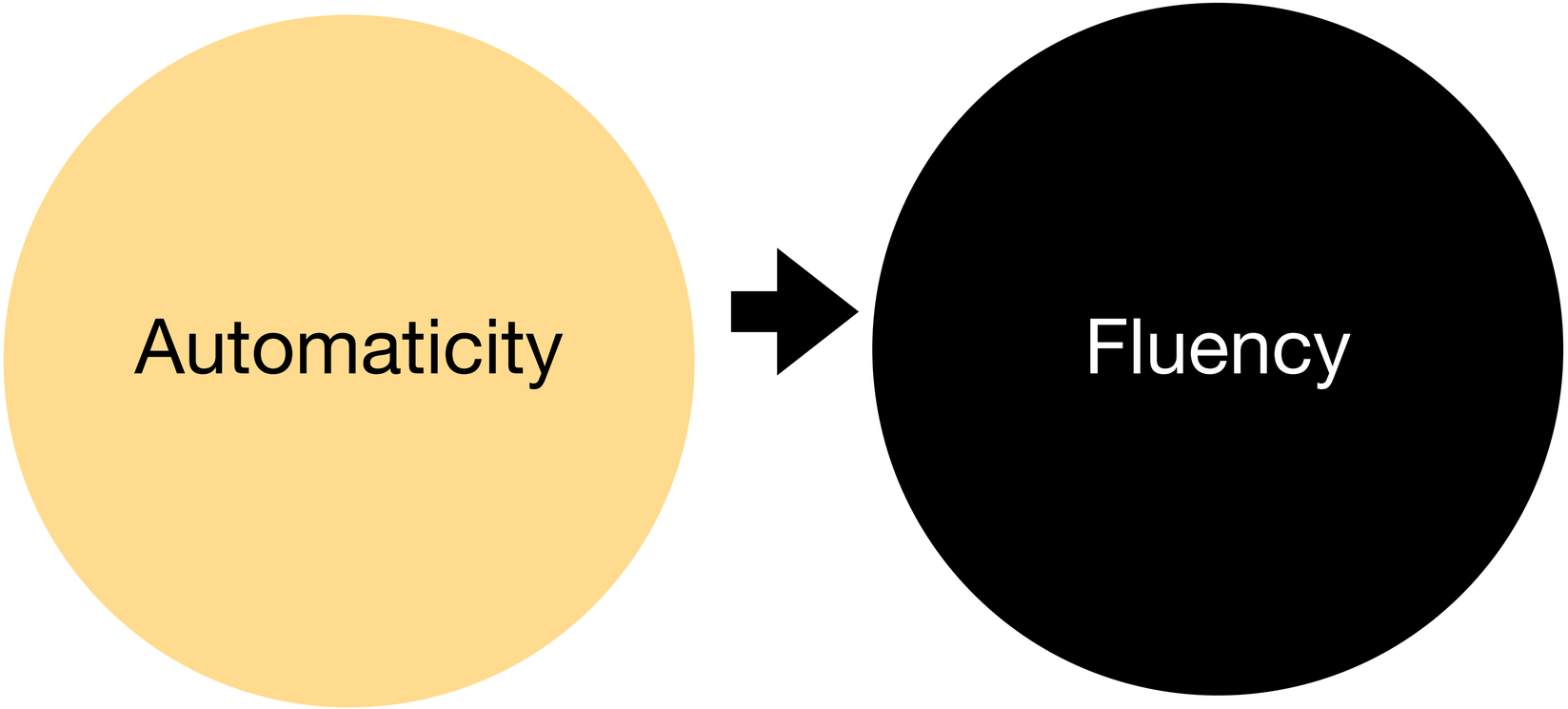
Easy Ones First

Slow and Steady Wins the Race

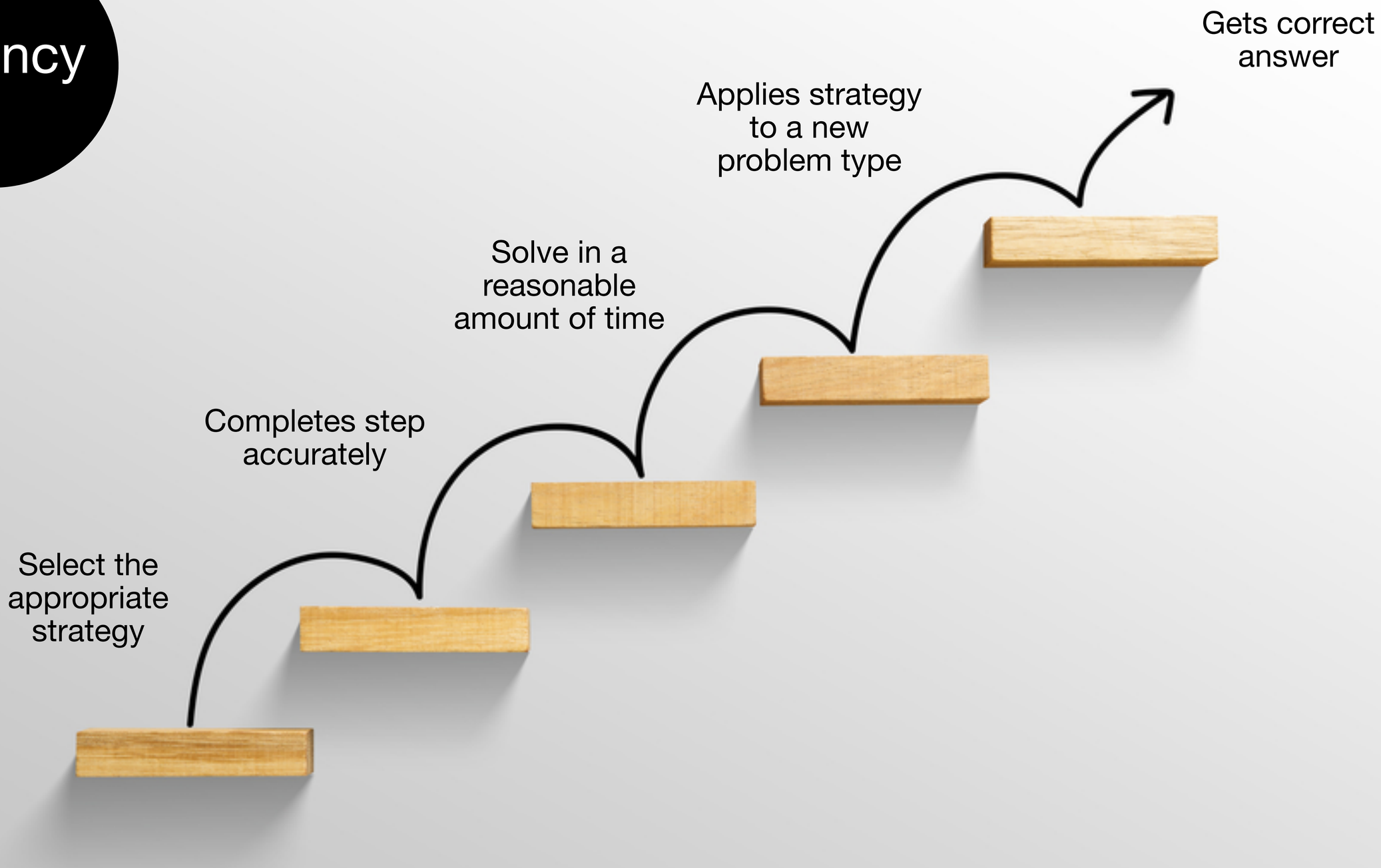


Teach three at a time

What’s Missing?



Fluency


Select the appropriate strategy
Completes step accurately
Solve in a reasonable amount of time
Applies strategy to a new problem type
Gets correct answer

Fluency

Why It Matters

- Encourages deeper understanding rather than rote memorization.
- Allows students to approach problems in different ways.
- Builds confidence in tackling unfamiliar problems.

Fluency

Examples

- **Solving 63 – 29 by breaking it into parts:**
  - **(63 – 30) + 1 = 34 instead of traditional borrowing.**

- Finding **16 × 25** by thinking:
  - **16 × (100 ÷ 4) = (16 × 100) ÷ 4 = 1600 ÷ 4 = 400.**

- Knowing that **12 × 15** can be found by:
  - **(12 × 10) + (12 × 5) = 120 + 60 = 180.**

Math

Fractions
570 - 680
2 recommended skills

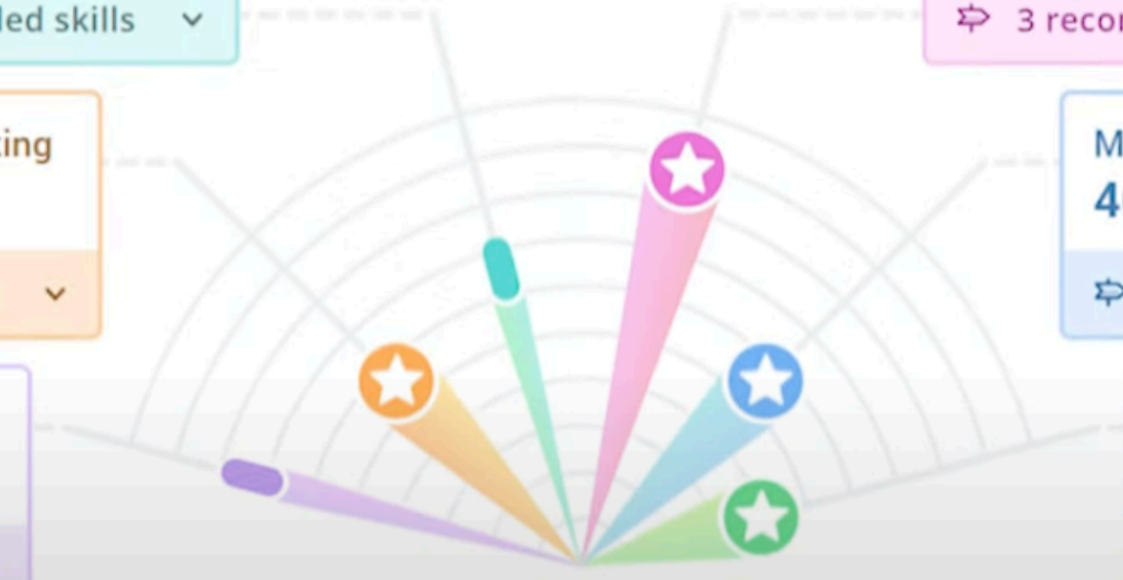
Geometry
780
3 recommended skills

Algebra & Algebraic Thinking
460
2 recommended skills

Measurement
460
3 recommended skills

Numbers & Operations
540 - 590
4 recommended skills

Data, Statistics, & Probability
300
3 recommended skills



overall math level

520 - 570

Overall math level

0 100 200 300 400 500 **560** 700 800 900 1000 1100 1200 1300

Math strand levels and recommendations

Numbers & Operations

0 **600** 1300

2 recommended skills

- [ ] Compare decimals using grids (Level G) >> QTG
- [ ] Multiply 2-digit numbers by 2-digit numbers (Level G) >> LLJ

Algebra & Algebraic Thinking

0 **460** 1300

1 recommended skill

- [ ] Multiply using the distributive property (Level E) >> 6W7

How do you fix gaps in  ?

Filling Pre-algebra gaps

$$5\frac{2}{4} - 2\frac{3}{5}$$

$$\begin{array}{r} 5\frac{2}{4} \\ -\,2\frac{3}{5} \\ \hline \end{array}$$

$$\begin{array}{rcl} {}^{4}\cancel{5}\frac{2}{4} & = & \frac{\cancel{10}\ \overset{30}{\cancel{+20}}}{20} \\ -\ 2\frac{3}{5} & = & \frac{12}{20} \\ \hline 2 & & \frac{18}{20} \end{array}$$

$$2 \qquad \frac{18}{20} \div \frac{2}{2} = \frac{9}{10}$$

$$2\ \frac{9}{10}$$

Step 1: Find a common denominator

Step 2: Make equivalent fractions

Step 3: Regroup

Step 4: Subtract mixed numbers

Step 5: Simplify

Nicole the Math Lady

Mastery Bank Recommended Topics by Textbook

		Recommended skills to have if you will be entering...								
Topic	**Sub Topic**	**Saxon 5/4 or Intermediate 5**	**Saxon 6/5 or Intermediate 5**	**Saxon 7/6 or Course 1**	**Saxon 8/7 or Course 2**	**Algebra 1/2 or Course 3**	**Algebra 1**	**Algebra 2**	**Geometry**	**Advanced Math**
Time	Reading Time on a Clock on the 5 or 10 minute mark	X	X	X	X	X	X	X	X	X
	Reading Time on a Clock	X	X	X	X	X	X	X	X	X
Numbers & Properties	Whole Numbers on a Number Line	X	X	X	X	X	X	X	X	X
	Comparing Whole Numbers	X	X	X	X	X	X	X	X	X
	Properties of Operations (Commutative, Distributive, Associative, Identity)				X	X	X	X	X	X
	Complete the Sequence		X	X	X	X	X	X	X	X
Place Value	The Hundreds Place	X	X	X	X	X	X	X	X	X
	Numbers up to 999	X	X	X	X	X	X	X	X	X
	Numbers up to the Hundred Thousands		X	X	X	X	X	X	X	X
	Numbers up to the Hundred Millions		X	X	X	X	X	X	X	X
Rounding	Rounding Numbers to the Nearest Ten	X	X	X	X	X	X	X	X	X
	Rounding Numbers to the Nearest Hundred		X	X	X	X	X	X	X	X
	Rounding Numbers to the Nearest Thousand		X	X	X	X	X	X	X	X
	Rounding Numbers to the Nearest Million,Billion and Trillions			X	X	X	X	X	X	X
	Estimating Addition and Subtraction Answers		X	X	X	X	X	X	X	X
	Estimating Multiplication and Division Answers		X	X	X	X	X	X	X	X
Addition	Addition with Two Digits - No Regrouping	X	X	X	X	X	X	X	X	X
	Addition with Two Digits - Some Regrouping	X	X	X	X	X	X	X	X	X
	Addition with Three Digits - No Regrouping	X	X	X	X	X	X	X	X	X
	Addition with Three Digits - Some Regrouping	X	X	X	X	X	X	X	X	X
	Addition with More Than Three Digits	X	X	X	X	X	X	X	X	X
Subtraction	Subtraction with Two Digits - No Regrouping	X	X	X	X	X	X	X	X	X
	Subtraction with Two Digits - Some Regrouping	X	X	X	X	X	X	X	X	X
	Subtraction with Three Digits - No Regrouping	X	X	X	X	X	X	X	X	X
	Subtraction with Three Digits - Some Regrouping	X	X	X	X	X	X	X	X	X

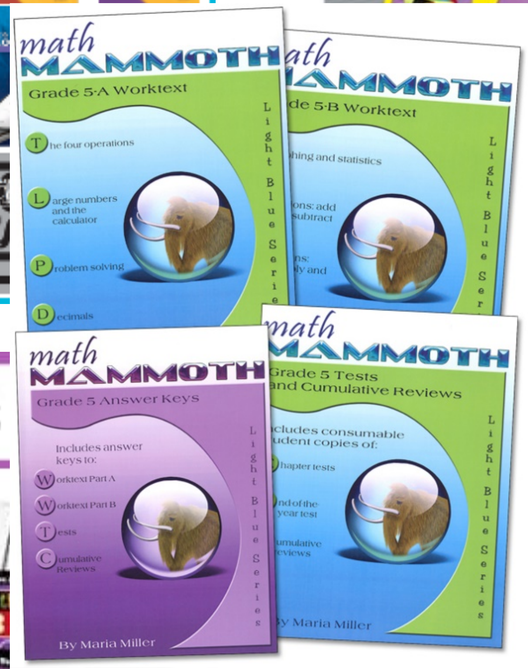
Math Topics by Grade Level

Should I change my math curriculum?

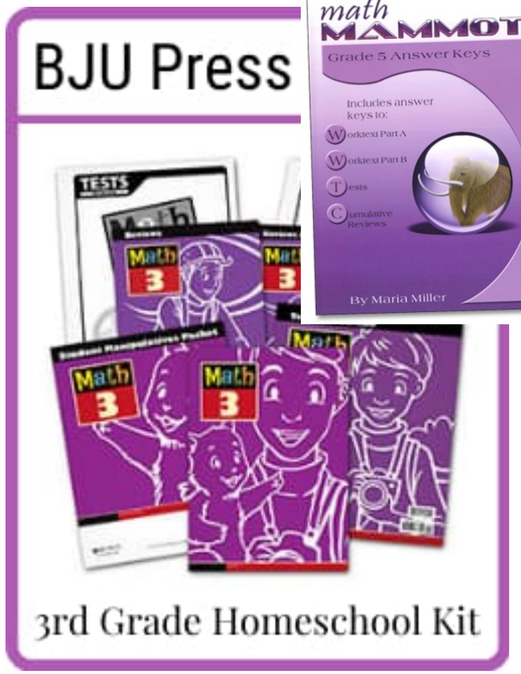

SAXON MATH
Math K
Math 1
Math 2
Math 3
Algebra 1
Advanced Mathematics


ARITHMETIC 3
Tests and Speed Drills
HOME SCHOOL
Arithmetic Charts 3-8
HOMESCHOOL
Arithmetic 3
ARITHMETIC 3
Work-text


Horizons
Math
Teacher's Guide
Horizons
Math
Horizons
Math
Book 2
K
K


math MAMMOTH
Grade 5-A Worktext
The four operations
Large numbers and the calculator
Problem solving
Decimals
Light Blue Series
math MAMMOTH
Grade 5-B Worktext
math MAMMOTH
Grade 5 Answer Keys
Includes answer keys to:
Worktext Part A
Worktext Part B
Tests
Cumulative Reviews
By Maria Miller
math MAMMOTH
Grade 5 Tests and Cumulative Reviews
Includes consumable student copies of:
Chapter tests
End of the year test
Cumulative reviews
By Maria Miller


ARITHMETIC 3-4
CONCEPT CARDS
Life of Fred


BJU Press
TESTS
Math 3
Math 3
Math 3
3rd Grade Homeschool Kit


Primer
Alpha
Beta
Gamma
Delta
Epsilon
Zeta


Math-U-See
Building Understanding
Singapore
LEVEL 4 A&B
LEVEL 3 A&B
LEVEL 2 A&B
LEVEL 1 A&B
Appropriate for students in Grade 2
Boost Problem Solving and Critical Thinking for Math Mastery
ADDING NUMBERS UP TO 10

Rainbow Resource
Math Comparison Chart

MATH CURRICULUM COMPARISON CHART

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	MATH Programs	Grades													Religious Content		Price Range		
		PK	K	1	2	3	4	5	6	7	8	9	10	11	12	Christian	N/Secular	$	$$	$$$
1.	Saxon K-3 *		•	•	•	•											•			•
2.	Saxon 3-12 *					•	•	•	•	•	•	•	•	•	•		•		•	
3.	Bob Jones		•	•	•	•	•	•	•	•	•	•	•	•	•	•				•
4.	AOP Horizons Math *		•	•	•	•	•	•	•	•	•						•		•	
5.	AOP LIFEPAC Math *		•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	
6.	AOP Monarch / Switched-On Schoolhouse					•	•	•	•	•	•	•	•	•	•	•			•	
7.	Math-U-See *	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•			•
8.	Abeka Math	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	
9.	Primary Math 2022 (Singapore)		•	•	•	•	•	•									•		•	
10.	Primary Math (US) (Singapore) *		•	•	•	•	•	•	•								•		•	
11.	Primary Math Standards Edition (SE) (Singapore) *		•	•	•	•	•	•	•								•		•	
12.	Primary Math Common Core (CC) (Singapore)		•	•	•	•	•	•									•		•	
13.	Math in Focus (Singapore) *		•	•	•	•	•	•	•	•	•						•			•
14.	Calvert Math		•	•	•												•		•	
15.	Exploring Creation with Mathematics (Apologia)			•	•	•										•			•	
16.	Good & Beautiful Simply Math		•	•	•	•	•	•								•		•		
17.	Shaping Maths (Singapore)			•	•	•	•	•	•								•			•
18.	Christian Light Math			•	•	•	•	•	•	•	•	•	•	•	•	•			•	
19.	Life of Fred			•	•	•	•	•	•	•	•	•	•	•	•	•		•		
20.	A+ Tutorsoft Math			•	•	•	•	•	•	•	•	•					•		•	
21.	Starline Press Math					•	•	•	•	•	•	•	•	•	•		•			•
22.	ShillerMath	•	•	•	•	•	•	•	•	•							•		•	
23.	enVision Math (2017/2018)		•	•	•	•	•	•	•	•	•	•	•	•			•			•
24.	Purposeful Design Math (2nd Ed.)		•	•	•	•	•	•	•							•				•
25.	Making Math Meaningful		•	•	•	•	•	•	•	•	•					•		•		
26.	RightStart Mathematics *		•	•	•	•	•	•	•	•							•			•
27.	MCP Mathematics		•	•	•	•	•	•	•								•	•		
28.	Conventional (Spunky Donkey) / Study Time Math			•	•	•	•	•	•	•	•					•		•		
29.	Liberty Mathematics		•	•	•											•		•		
30.	Miquon Math			•	•	•											•	•		
31.	Math Mammoth (Light Blue series) *			•	•	•	•	•	•	•							•	•		
32.	Ray's Arithmetic			•	•	•	•	•	•	•	•						•	•		
33.	Ray's for Today			•	•	•	•	•	•	•	•						•		•	
34.	Rod & Staff Mathematics			•	•	•	•	•	•	•	•					•		•		
35.	Jump Math			•	•	•	•	•	•	•	•						•	•		
36.	ThemeVille Math *			•	•	•	•	•									•		•	
37.	Beast Academy (from Art of Problem Solving) *				•	•	•	•									•			•
38.	Strayer-Upton Practical Arithmetic					•	•	•	•	•	•						•	•		
39.	Art of Problem Solving *								•	•	•	•	•	•	•		•		•	
40.	Paradigm Accelerated									•	•						•		•	
41.	Principles of Mathematics/Algebra 2									•	•			•	•	•			•	
42.	A Fresh Approach										•	•	•	•	•		•		•	
43.	Jacobs Math											•	•				•			•
44.	Foerster Math (Math Without Borders)											•	•	•	•		•			•
45.	VideoText										•	•	•	•	•		•			•
46.	Math Lessons for a Living Education		•	•	•	•	•	•	•							•		•		
47.	Mathematical Reasoning	•	•	•	•	•	•	•	•	•	•	•	•				•	•		
48.	Developmental Math		•	•	•	•	•	•	•	•	•						•	•		
49.	Math Power Basics									•	•	•	•	•	•		•	•		

This chart was assembled by Rainbow Resource Curriculum Consultants and is intended to be a comparative tool based on our own understanding of these programs and is not necessarily reflective of publishers' opinions. Some programs are "Best Fit," not ideal at all.

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Placement tests are available on our website for programs marked with an (*).
Find them at: ***https://www.rainbowresource.com/hSearch.jhtm?keyword=math+placement+tests***

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	Approach			Manipulatives			Teacher Involvement			CCSS Aligned	Notes
	Spiral	Sequential	Conceptual/Topical	Req	Opt	RRC kit	Low	Med	High		
1.	•			•		•			•		Scripted teacher manuals.
2.	•				•		•				Teaching tutorials available separately.
3.	•								•		Paper manipulatives included.
4.	•				•	•		•			Grades 4-8 contain some religious content.
5.		•						•			
6.		•					•				Monarch is online only. SOS is computer-based.
7.		•		•				•			Mastery-based. Optional songs some Christian content.
8.	•			•				•			
9.		•		•				•			Digital manipulatives. Online components.
10.		•			•			•			
11.		•			•			•			Aligned to 1997 CA Standards. 2008 Ed.
12.		•			•			•		•	
13.		•		•		•		•		•	
14.		•			•			•			
15.		•			•				•		Projects included with each lesson.
16.	•			•				•			K-3: parent taught & includes manipulatives; AK online.
17.		•			•			•		•	2013. Singaporean money. Metric. Online component.
18.	•							•			Suggested manipulatives for lower grades.
19.		•					•				Brief Christian references in elementary levels.
20.		•					•				Computer-based.
21.		•					•				
22.		•		•					•		Discovery, Montessori approach.
23.		•					•			•	Digital component.
24.		•			•	•			•		E-book option for teacher edition.
25.			•	•					•		
26.	•	•		•					•	•	
27.		•						•			Modified Sequential.
28.	•							•			Optional manipulatives for Spunky.
29.		•					•				Consumable workbooks.
30.			•	•					•		Uses Cuisenaire rods.
31.		•			•		•				B & W or color versions available.
32.		•						•			
33.		•			•			•			
34.		•						•			
35.		•							•	•	
36.	•			•				•			Manipulatives used at all levels.
37.			•				•				Recommended for gifted students.
38.		•						•			No Teacher Guide.
39.		•					•				Recommended for gifted students.
40.		•					•				
41.		•					•				
42.		•					•				
43.		•					•				Teaching tutorials available separately.
44.		•					•				MWB Teaching tutorials available separately.
45.		•					•				DVD or online format..
46.			•	•					•		Extra practice (L1-3). Teaching Companion avail.
47.	•						•				
48.		•			•		•				Skill-based levels.
49.		•					•				Written at 4th grade level / for struggling students.

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Rainbow Resource
Math Comparison Chart


SLOW
DOWN


Consistency
is The Key

No Credit Card Required 7-Day Free Trial

- Saxon Math Videos and Grading
- Singapore Math Grading Videos and Online Grading (Videos Coming This Summer)
- Annual Membership start at $79

- Learn Addition & Subtraction Math Facts in 60 days

- Learn Multiplication & Division Facts in 90 days

- $21.99 for a single student/ Free Adventure Kit at booth


Drill Team
Drill Team
Drill Team