The Sage from the East: Michael Xu's Story as a Mirror to America's Math Education Crisis

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https://x.com/FightFuzzyMath/status/2056397890059444520?s=20

Post 1

Most people only know Jaime Escalante from ***Stand and Deliver***.

Few know there was a Chinese immigrant teacher who did something just as extraordinary:

For 20 years in the Arizona desert, he took the state's poorest Indigenous, Latino, and Black middle schoolers — many with broken English and shattered foundations — and turned them into statewide champions.

His name is Michael Xu.

The "Sage from the East."

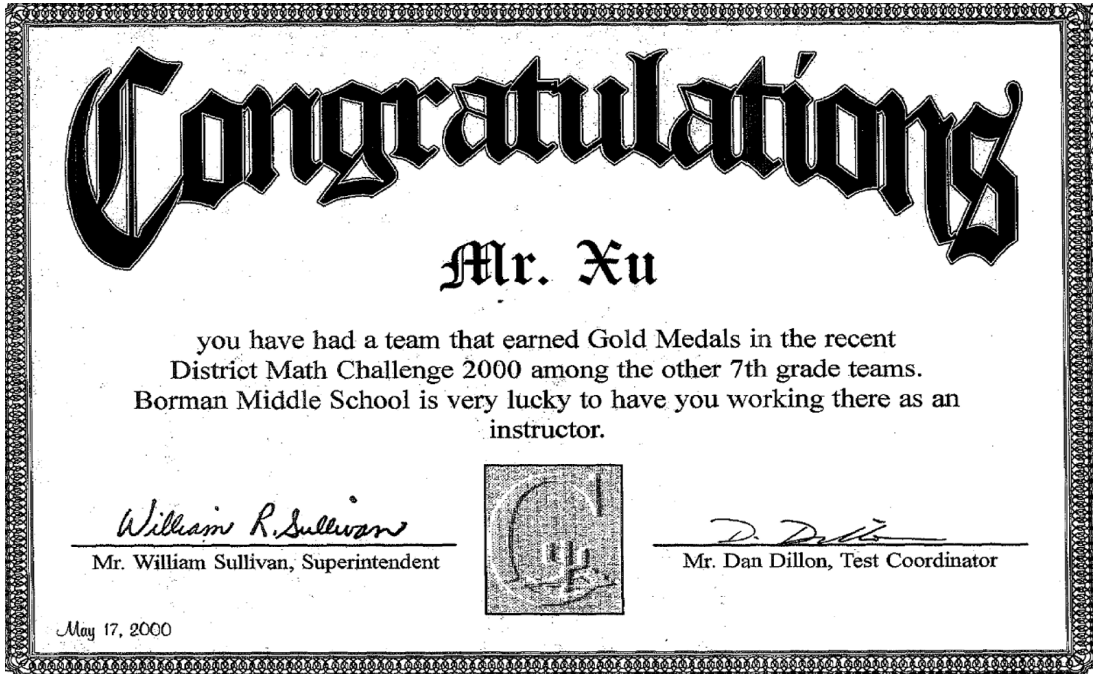
A man who survived China's Cultural Revolution, hard labor in the jungle, lifelong dyslexia, and insomnia… yet became a legendary math teacher.

This thread is the first time his full story is being told.

And it reveals something much bigger than one teacher's success.

Michael Xu, Whose Legendary Success Reveals the Root Cause of U.S. Math Education Failure

- When Arizona's statewide math exam had only a 4% pass rate, over 40% of Mr. Xu's students passed. Soon he hit 100% pass rates year after year.
- His teams swept nearly all the gold medals in the state's first math competition.
- Even when the school secretly filled his "gifted" class with regular students, they all reached gifted level.


Congratulations

Mr. Xu

you have had a team that earned Gold Medals in the recent District Math Challenge 2000 among the other 7th grade teams. Borman Middle School is very lucky to have you working there as an instructor.

William R. Sullivan
Mr. William Sullivan, Superintendent

Mr. Dan Dillon, Test Coordinator

May 17, 2000

Post 2

Now, fellow Chinese immigrant and award-winning author Yellow Heights is telling Mr. Xu's full story in a powerful new bilingual Substack series:

https://yellowheights.substack.com/p/introducing-mr-xu-a-special-math

This isn't just one teacher's miracle.

It raises two explosive questions that cut to the heart of America's education crisis:

1. Is Mr. Xu's miracle a victory for progressive education — or powerful proof against it?

2. Why did his students arrive in midde school with shockingly weak math foundations?

Why has U.S. K-12 math failed generations of kids?

Post 3

Before the miracle, face the brutal reality Mr. Xu walked into.

His first year felt like total defeat.

Chaos. No discipline. Constant rebellion.

Kids already defeated before they sat down.

Middle schoolers with arithmetic knowledge that left him stunned — full of deep misconceptions about what math even is.

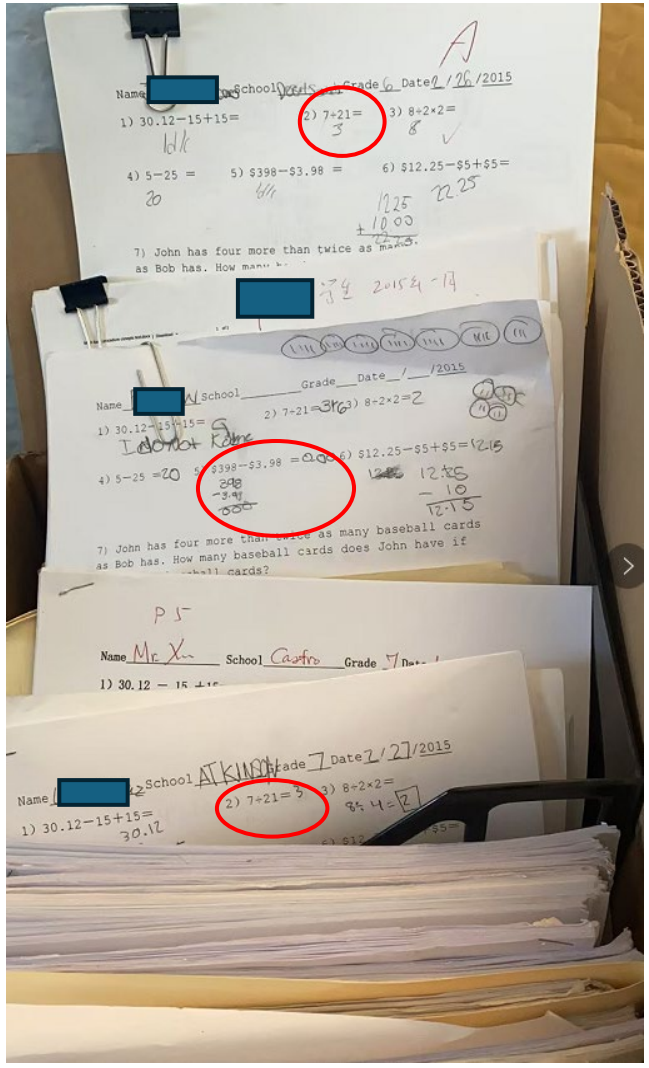
https://yellowheights.substack.com/p/chapter-2-teaching-math-in-america

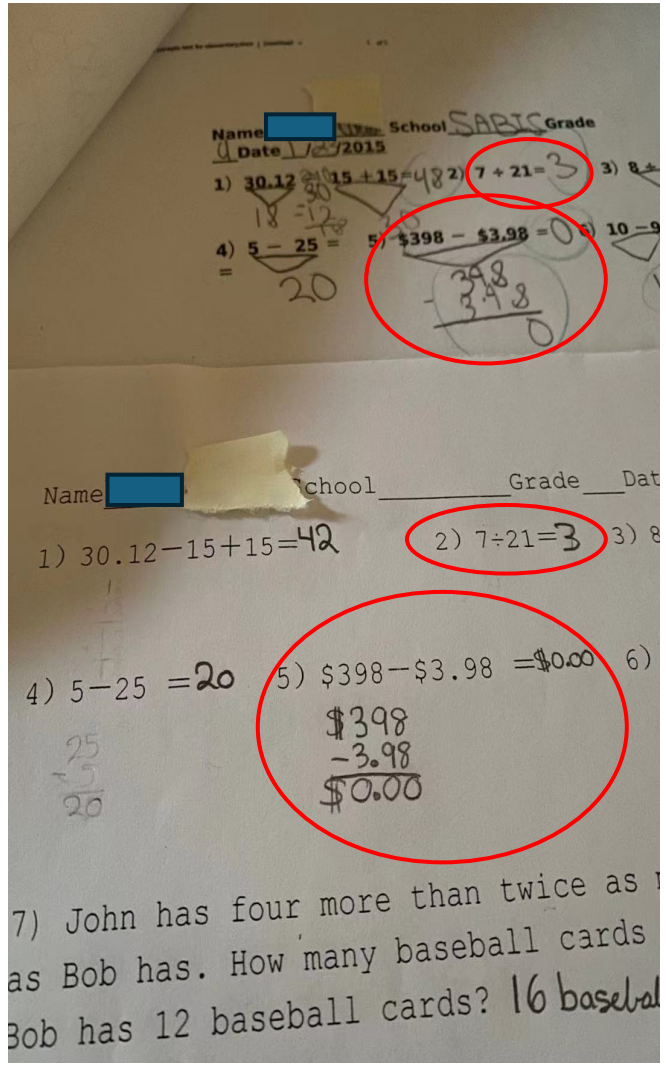
Inside a Chaotic Math Classroom: When Students Don't Understand

- But the bigger reason for the [teacher] shortage is that teaching has its own unique difficulties. Elementary school is relatively manageable: the material is simpler, and young children have not yet entered their rebellious phase. Middle school is completely different.
- Imagine this: a teacher stands in front of twenty or thirty teenagers, explaining material that most of them do not understand. The teacher must persuade a room full of energetic yet bored adolescents to sit still and learn something they already believe they cannot master. It is an extremely awkward situation.
- You walk into the classroom and begin teaching according to the textbook, because the school requires you to prepare lesson plans two weeks in advance and follow the curriculum. This week's topic is adding and subtracting fractions, and you start explaining it on the board. As soon as you begin writing, you start losing the students in the back because they don't understand. When you're not looking, one of them pokes the student next to him or starts fooling around. Because he can't do the problem, he feels frustrated. He wants to escape, and he becomes restless. The moment you turn your back, someone throws something; a paper airplane starts flying across the room. Soon the classroom becomes lively in the worst way.
- Once the classroom turns chaotic, you can raise your voice, get angry, threaten punishment, or promise rewards. These methods may work temporarily, but they don't last long. The most mischievous and thick-skinned students simply don't care. The angrier you become, the more excited they get, because their goal is simply to "tease you."
- To change this awkward situation, teachers must actually help students learn and turn muddy water into clear water. Otherwise, the job becomes more like being a police officer than being a teacher.

When Students Treat Math as Rote Memorization: Common Errors That Reveal Deep Misunderstandings

- Another example: in some classes almost one hundred percent of the students believed that 7 ÷ 21 = 3. Very few students stopped to think about it.
- There is another problem I consider a classic example. Over the past twenty years I have collected thousands of student assignments containing it: $398 – $3.98 = ? Almost every class produced answers of zero. I have never seen this mistake in Chinese schools, but in American schools I have never seen a class completely free of it. There are always a few such answers, and sometimes as many as one-third of the students conclude that the result is $0.00.
- When I encounter this answer, I often ask students to read the problem aloud… “398 dollars subtract 3 dollars 98 cents equals 0 dollars 0 cents.” So I ask them: what is wrong with that?
- Some say something feels off, but others continue to insist: “Math usually doesn’t make sense—it just needs to be remembered.” This reveals their cognitive habits. They never think of mathematics as something logical. To them, it is simply a task imposed by school that must be memorized.





Post 4

Mr. Xu refused to quit.

Every year he did something radical: he ignored the textbook completely for the first two weeks.

He rebuilt his students' broken relationship with math itself.

He diagnosed the real problem: years of bad teaching had convinced these kids that

"Math is just rote memorization."

"Math doesn't make sense."

But Mr. Xu believed something truly radical: Every child can learn math.

Poor performance is not about limited talent — it's about bad teaching.

He set out to prove it.

https://yellowheights.substack.com/p/chapter-3-building-the-foundation

Poor Teaching Creates the Misconception: Math Is Rote, Not Reasoning

- Some say something feels off, but others continue to insist: “Math usually doesn’t make sense—it just needs to be remembered.” This reveals their cognitive habits. They never think of mathematics as something logical. To them, it is simply a task imposed by school that must be memorized.
- I once conducted a survey asking students to choose between two statements that they agree with: “Does mathematics require thinking?” or “Does mathematics not require thinking—only remembering the steps or procedures taught by the teacher and following the examples in the textbook step by step?”
- Very few students believed mathematics required thinking. The vast majority believed that as long as they memorized the procedures, they could get the correct answer.
- For a long time I refused to believe that American students were simply “not very bright.” Only then did I realize that they had actually been failed by the way mathematics was taught in school.
- From the very beginning they felt defeated by mathematics. They carried a psychological burden and often a sense of frustration. They did not believe they could learn math, nor did they believe math had anything to do with them. When I called parents in for conferences and explained this situation, some parents told me:
“It’s okay—you don’t need to worry about him. His mother didn’t finish high school, and I never understood math either. It’s a family thing. Math just isn’t for our family. Don’t force him to learn it. He won’t be able to.” Their attitude was essentially this: mathematics has nothing to do with us. Teaching him math would be like teaching a puppy to count. If parents think this way, children naturally lose even more confidence that they can learn mathematics.

Rigid Pacing and Unrealistic Expectations: Why Students Lack Foundations and Misbehave

- I also faced another huge problem: the school required me to follow a fixed schedule for every lesson. But the students were nowhere near that level. The vast majority could not understand the material at all and could not keep up. This is actually one of the main reasons why students' foundations are so weak and why they come to dislike mathematics and believe that math has no logic.
- Educational theory includes Vygotsky's concept of the *Zone of Proximal Development*. Each person has a "known area" surrounded by an ocean of the "unknown area". You can only push a student a little beyond the edge of what they already know. Only then can their knowledge expand slightly. It is like a seedling: if you give it a little soil and water, its roots grow downward and its shoots grow upward. But if you try to pull the plant upward by an inch, you separate the roots from the soil, and the plant dies.
- Yet what schools require of teachers is exactly that: students who are one inch tall must be pulled to two inches. Teachers must follow the prescribed pace and the lesson plans written in advance. **But students lack the foundation, so they cannot understand the lesson. And when they cannot understand, they begin to misbehave.**

Every Child Can Learn Math: Struggles Reflect Bad Teaching, Not Limited Talent

- Regarding who can learn math well, the politically correct answer today is that every child can be a mathematician and learn math at the highest level. In certain contexts, you can get into trouble for not agreeing with this. Here is my personal view: everyone can speak and write, but most people cannot become Shakespeare, Tolstoy, or Hugo; similarly, not everyone can become a Gauss or Euler. However, based on my teaching experience, arithmetic with rational numbers is far simpler than learning a language or speaking.
- **In all my years of teaching, I have never encountered a student who failed to master basic arithmetic due to intellectual limitations**.
- Elementary and middle school math should be accessible to all students. Even first-year university math is within the reach of most.
- Despite differences in talent, most people can learn a basic language and can also learn basic mathematics.
- I studied languages, so I know how difficult they are: thousands of words to memorize, grammar rules that are inconsistent, pronunciations that shift, and many things that "don't make sense."
- Math is not like that. One equals one, two equals two—it is definite and logical. I tell students: "Look, you only learn Spanish at home from your parents. At school, you quickly learn English. **If you can learn languages that are so difficult, you can certainly learn math. Math is simpler. Why are you afraid of it?" I tell them that anyone who can speak is fully capable of learning math, at least to an eighth-grade level.**
- Their current struggles are not their fault—they reflect previous teaching methods, not their ability. Even if their parents did not understand math, they can succeed and even excel, because they now have opportunities their parents did not.

Post 5

His first goal wasn’t just to teach math.

It was to help every child fall in love with math.

He wanted them to believe:

“I can learn math.”
“Math is fun and useful.”
“Math makes me smarter.”

While others pushed “real-world relevance” and group games, Mr. Xu showed them something deeper: the **intrinsic beauty and power** of mathematics — the “heavenly eye” that lets humans understand the universe.

Beyond Checkbooks and Coupons: Math as the Heavenly Eye for Ambitious Science Dreams

- What I tell my students goes beyond balancing a checkbook or using coupons optimally. I tell them that math is a language of nature, a profoundly elegant tool, like a “heavenly eye”. For example, we know the Moon orbits the Earth, the Earth orbits the Sun, and sometimes they align in a straight line, producing a lunar or solar eclipse. Without math, could we predict when these eclipses will occur? Using mathematics as our “heavenly eye,” we can predict every eclipse for thousands of years with high level of precision.
- The science we talk about today is essentially the study of the internal structures of the universe and the mathematical relationships among phenomena. Without math, science cannot exist. At best, all we have is a collection of observational summaries and accumulated practical experience. Math is not only nature’s language, but it also cultivates abstract reasoning ability. Humans are unprepared for such abstract reasoning by nature. Our short-term memory capacity is around seven items, varying individually between five and nine. The high level of abstraction and simplification in mathematics dramatically expands this limitation, allowing us to handle very complex reasoning layer by layer. Without such training, understanding multi-layered logical reasoning becomes very difficult, which in turn limits one’s ability to solve complex problems.

The Central Purpose of Math Education: Build Intellect, Creativity, and Joy — Not Just Skills

- In the age of AI, the primary purpose of math education is not to have students master a body of knowledge or memorize standard problem-solving procedures — nor even to train them in a technical skill for scientific research and engineering innovation. It is to help them learn how to think, and in that process build their confidence and bring them joy. Confucius said this two thousand years ago: “Those who know it are not as good as those who love it; those who love it are not as good as those who delight in it.” The teacher’s goal is not merely to help students acquire knowledge, but to help them learn as independently as possible — and more than that, to make them feel happy, to believe they are capable of learning, to make them feel that math really suits them. The love of learning will grow from that feeling.
- Teachers and parents are often far too eager, desperate to pour all their knowledge into students as fast as possible, while relishing how knowledgeable and helpful they are. But this robs students of the pleasure and sense of achievement that comes from the learning process. It misses the central purpose of mathematics education in the AI age: the development of the intellect, not the acquisition of knowledge or skills. Under the largely compulsory, top-down methods used in most schools today, students are forced to learn with little interest or love, perpetually in a mode of simply fulfilling some duties. In such a state, there is little cultivation of creativity, because creativity requires relentless questioning, probing, and deep investigation. Without love for the subject, it is very hard to enter that kind of state.

True Engagement in Math: Get Students to Think Actively, Not Just Entertain Them

- All education experts agree that making learning interesting is crucial. Yet their efforts often focus on making math highly entertaining or closely connected to the real-world. Turning every math problem into entertainment or practical tasks can be difficult, sometimes even impossible. Making learning feel interesting, however, is simple: get students to think actively.
- What children do or learn should be meaningful to them—useful, interesting, and enjoyable. Everyone is naturally curious and loves learning. If we allow, support, guide, and encourage them, they become active learners, fully engaged. Too much coercion or instruction creates passive learners. Passive learners do things merely to satisfy others; success or failure matters only for external evaluation. Active learners gain satisfaction and accomplishment through effort; the harder they work, the greater the sense of achievement.
- Everyone must think. **Not just using their hands with scissors or drawing but truly using their mind**.
- Students must feel it's "worth it"—they must see that thinking brings rewards. I love Gauss's saying: "The greatest pleasure comes not from what is already known, but from continuous learning."
- I'm not saying every teacher can do exactly what I do, but at least they can do two essential things: 1) Engage every student immediately. 2) Do not allow students to "pretend to participate." If teachers can do just these two things, the classroom changes instantly.
- My method essentially draws from Socrates, Gauss, the Feynman technique, Vygotsky's zone of proximal development, and mastery learning. I didn't know these theories at the time, but in practice I discovered they all point to the same idea: Make students think. Make learning make sense.
- If learning doesn't make sense to students, they feel frustrated, lose confidence, and develop misconceptions.
- I have students think, discuss, and explain so that math makes sense to them.

Post 6

Class management is one of the biggest headaches in underperforming schools.

But Mr. Xu discovered **the real root of the chaos**: years of bad teaching.

He figured out something powerful:

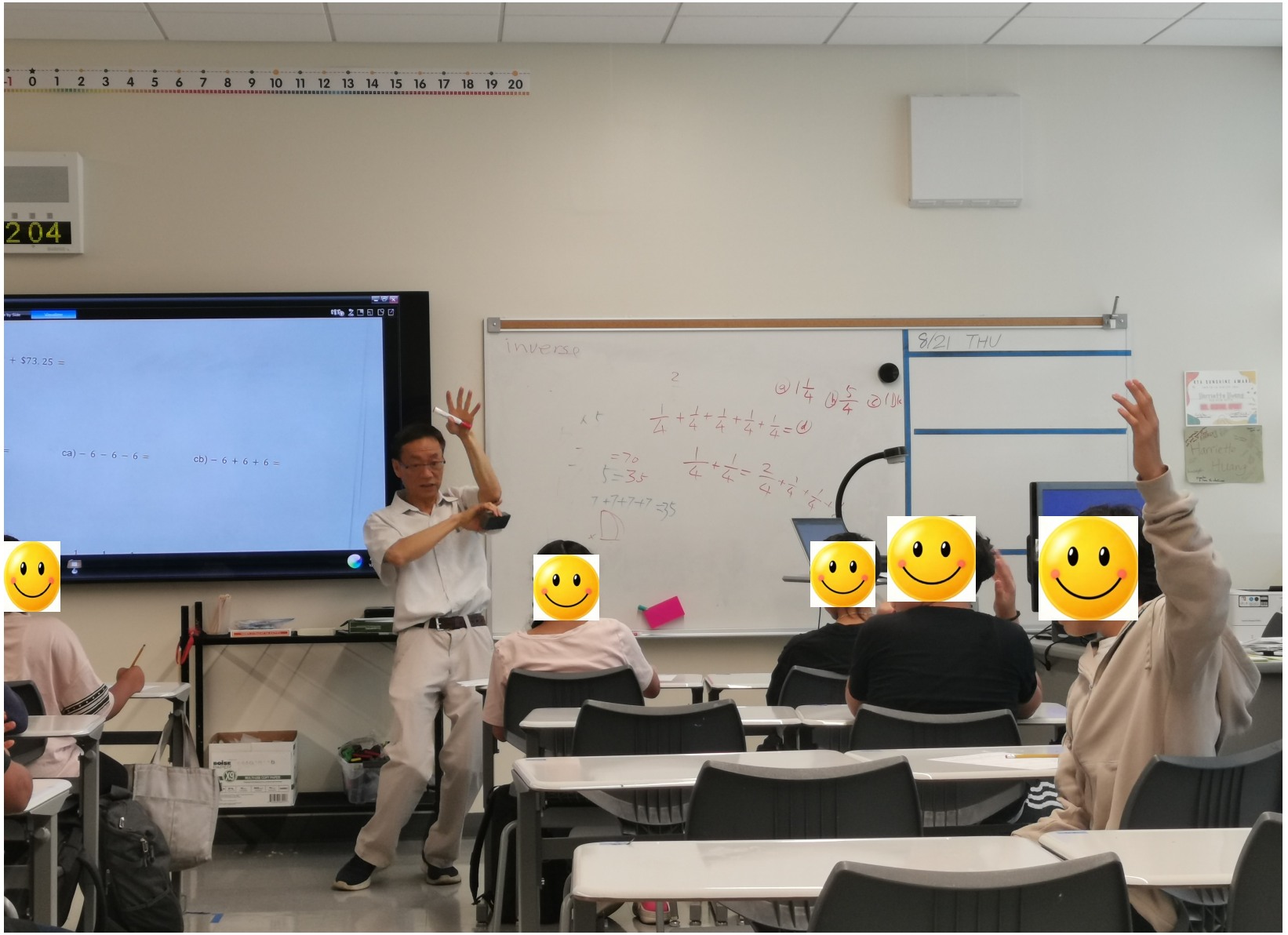
“The more noisy a student is, the stronger their curiosity often is. **If you can capture their curiosity, you can capture their attention**. Only then can you truly settle them down and have control of the classroom.”

Once students felt safe to be curious, the chaos disappeared.

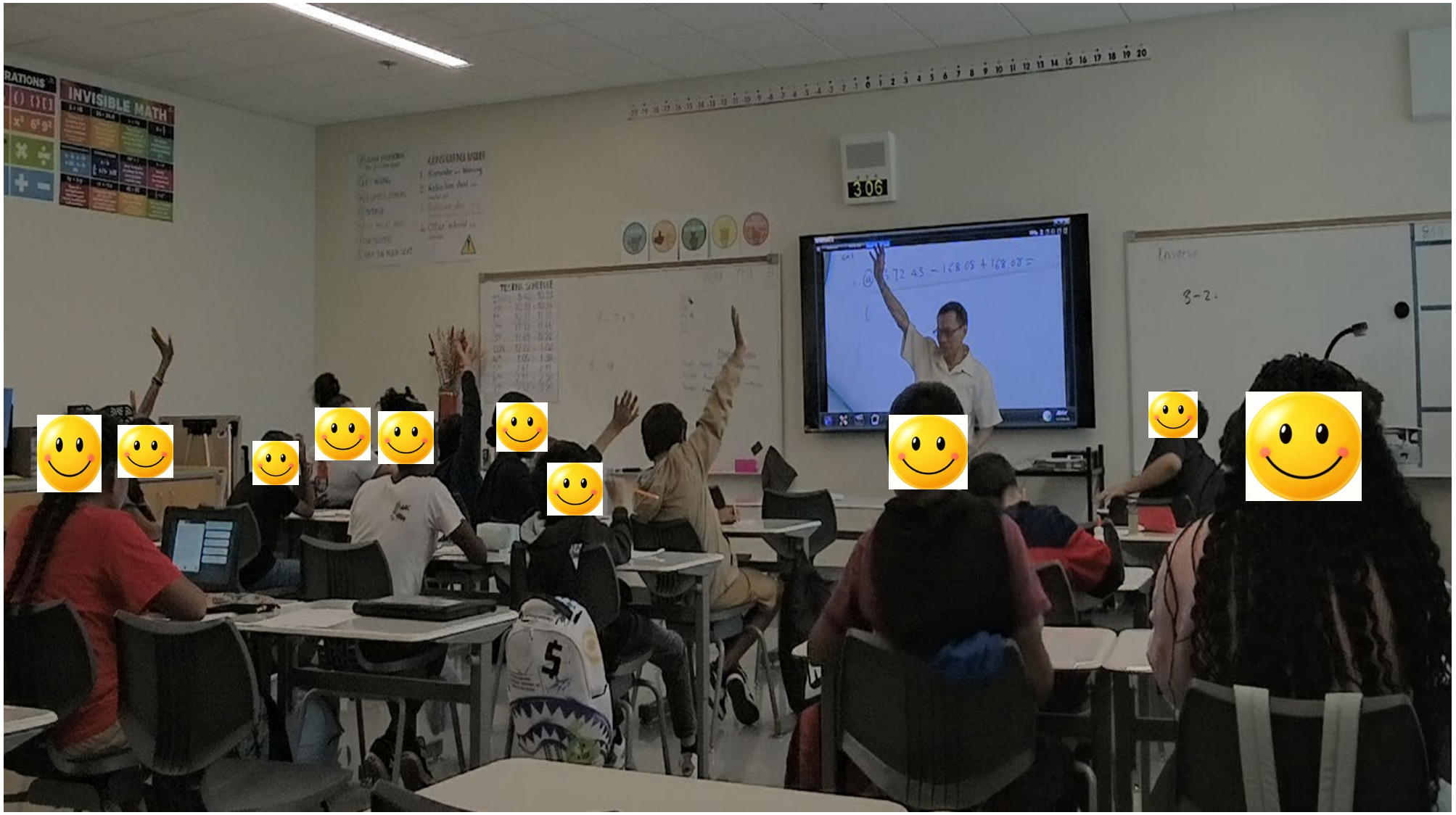
How Sparking Curiosity Solves Classroom Chaos

- **While struggling in managing classrooms, I gradually realized something: the more noisy a student is, the stronger their curiosity often is. If you can capture their curiosity, you can capture their attention. Only then can you truly settle them down and have control of the classroom.** That attention comes from curiosity—from the moment when a student suddenly shouts, “Oh!” or blurts out, “Ah, I know it!” Once you catch that moment, they begin to listen.
- Once curiosity is ignited, they begin to reason, to search for patterns, and to think. I discovered that students actually enjoy thinking very much. What is especially interesting is that the most mischievous student—the one who usually cannot solve problems—is often the first to guess the pattern. Once they start thinking, the whole atmosphere of the classroom changes.
- When students lose their attention, classroom management becomes very difficult.
- Once students are genuinely engaged, they stop misbehaving.
- This discovery convinced me even more strongly that mathematics is a deeply internal and independent thinking process. **Many so-called “collaborative learning” or “group activities” can sometimes help, but most of the time they become distractions.** Mathematics requires the individual mind to explore quietly; once that process is interrupted, it is very difficult to resume.
- So I asked every student to explore on their own.

How Sparking Curiosity Solves Classroom Chaos



How Sparking Curiosity Solves Classroom Chaos



Post 7

Then came one of his greatest inventions: **the IDK Method**.

Traumatized as a child in China where saying “I don’t know” could be dangerous, he created a judgment-free zone where kids could openly admit they were lost… and then work together to figure it out.

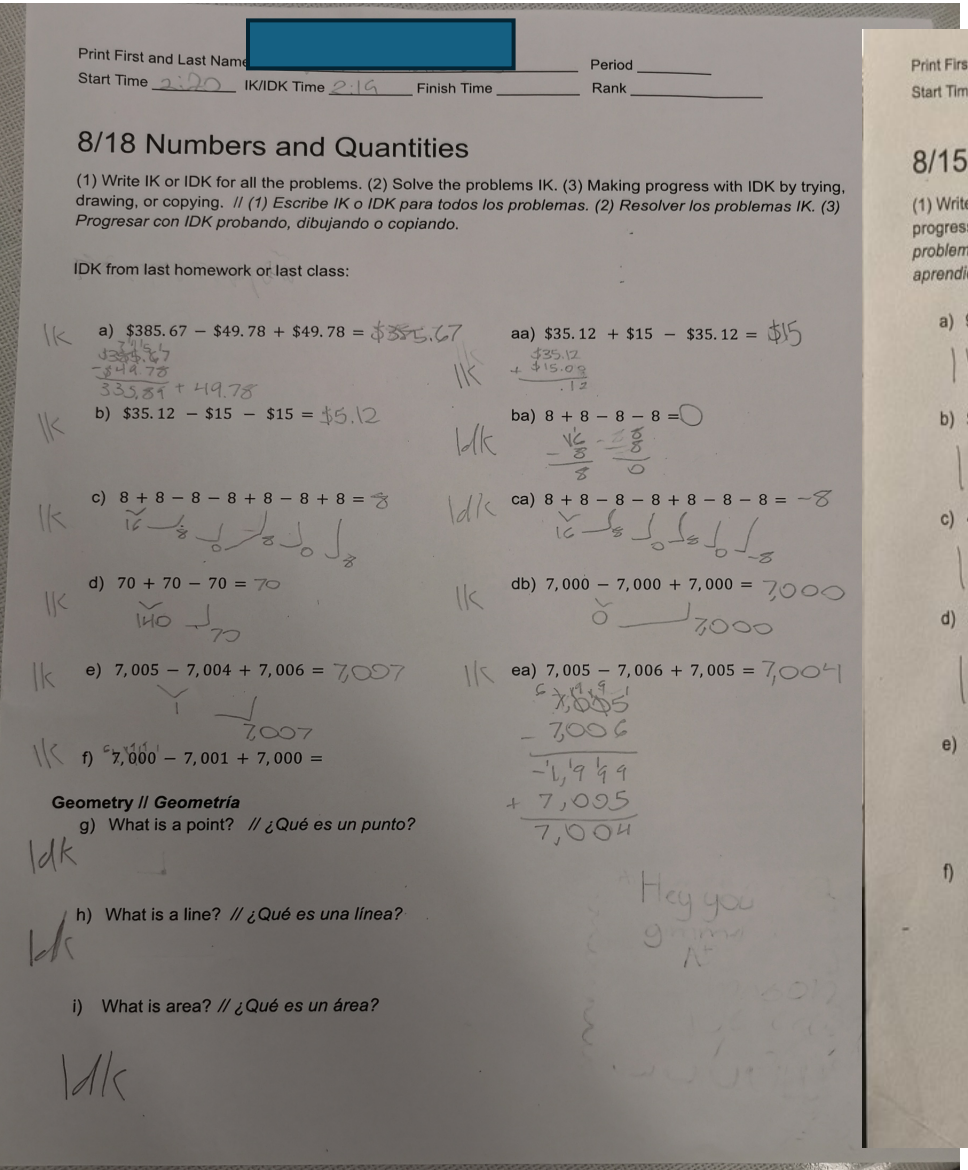
Shy kids became confident leaders.

Strugglers became state champions.

Chaos disappeared. Intellectual courage exploded.

https://yellowheights.substack.com/p/chapter-4-the-idk-method

The Magical "I Don't Know (IDK)" Method



Print First and Last Name [redacted] Period _____
Start Time 2:20 IK/IDK Time 2:19 Finish Time _____ Rank _____

8/18 Numbers and Quantities

(1) Write IK or IDK for all the problems. (2) Solve the problems IK. (3) Making progress with IDK by trying, drawing, or copying. *// (1) Escribe IK o IDK para todos los problemas. (2) Resolver los problemas IK. (3) Progresar con IDK probando, dibujando o copiando.*

IDK from last homework or last class:

a) $385.67 − $49.78 + $49.78 = $385.67
b) $35.12 − $15 − $15 = $5.12
c) 8 + 8 − 8 − 8 + 8 − 8 + 8 = 8
d) 70 + 70 − 70 = 70
e) 7,005 − 7,004 + 7,006 = 7007
f) 7,000 − 7,001 + 7,000 =

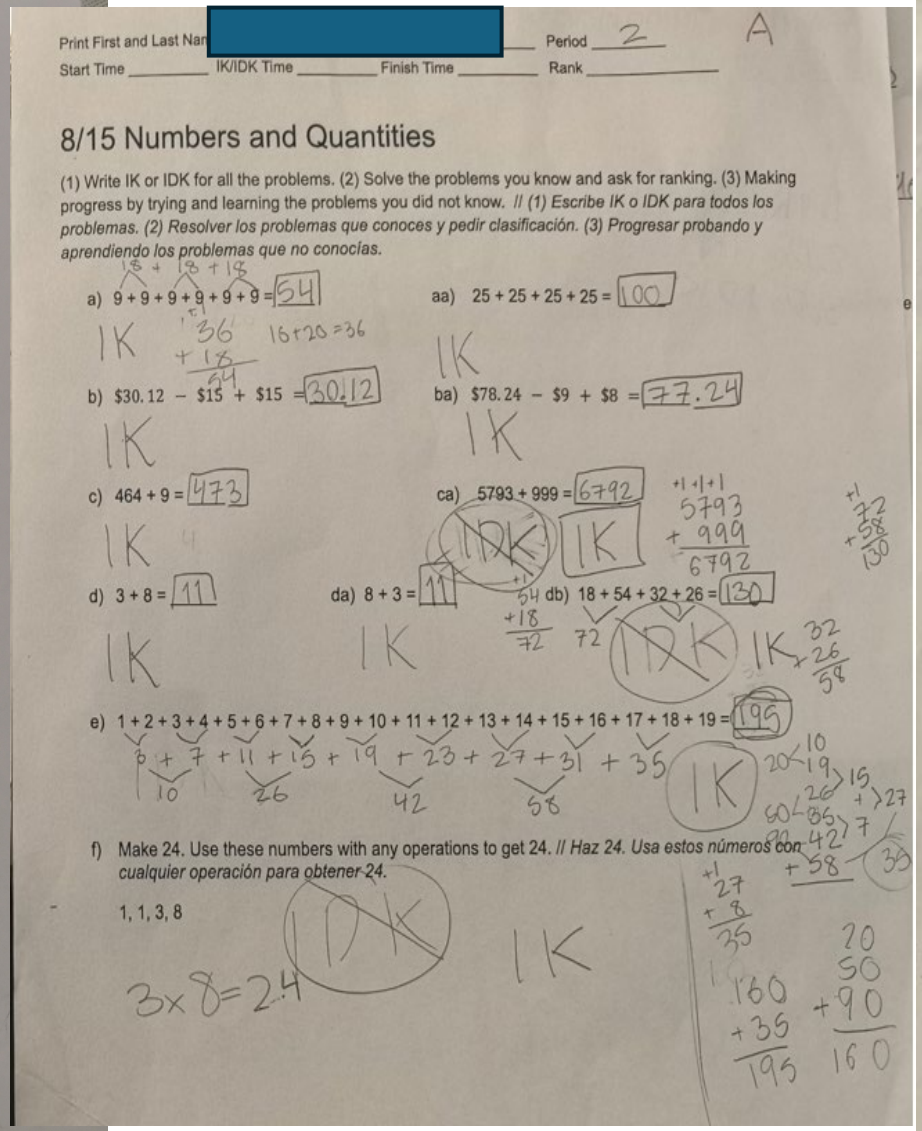
aa) $35.12 + $15 − $35.12 = $15
ba) 8 + 8 − 8 − 8 = 0
ca) 8 + 8 − 8 − 8 + 8 − 8 − 8 = −8
db) 7,000 − 7,000 + 7,000 = 7,000
ea) 7,005 − 7,006 + 7,005 = 7,004

Geometry // *Geometría*

g) What is a point? *// ¿Qué es un punto?*

h) What is a line? *// ¿Qué es una línea?*

i) What is area? *// ¿Qué es un área?*



Print First and Last Name [redacted] Period 2
Start Time _____ IK/IDK Time _____ Finish Time _____ Rank _____

8/15 Numbers and Quantities

(1) Write IK or IDK for all the problems. (2) Solve the problems you know and ask for ranking. (3) Making progress by trying and learning the problems you did not know. *// (1) Escribe IK o IDK para todos los problemas. (2) Resolver los problemas que conoces y pedir clasificación. (3) Progresar probando y aprendiendo los problemas que no conocías.*

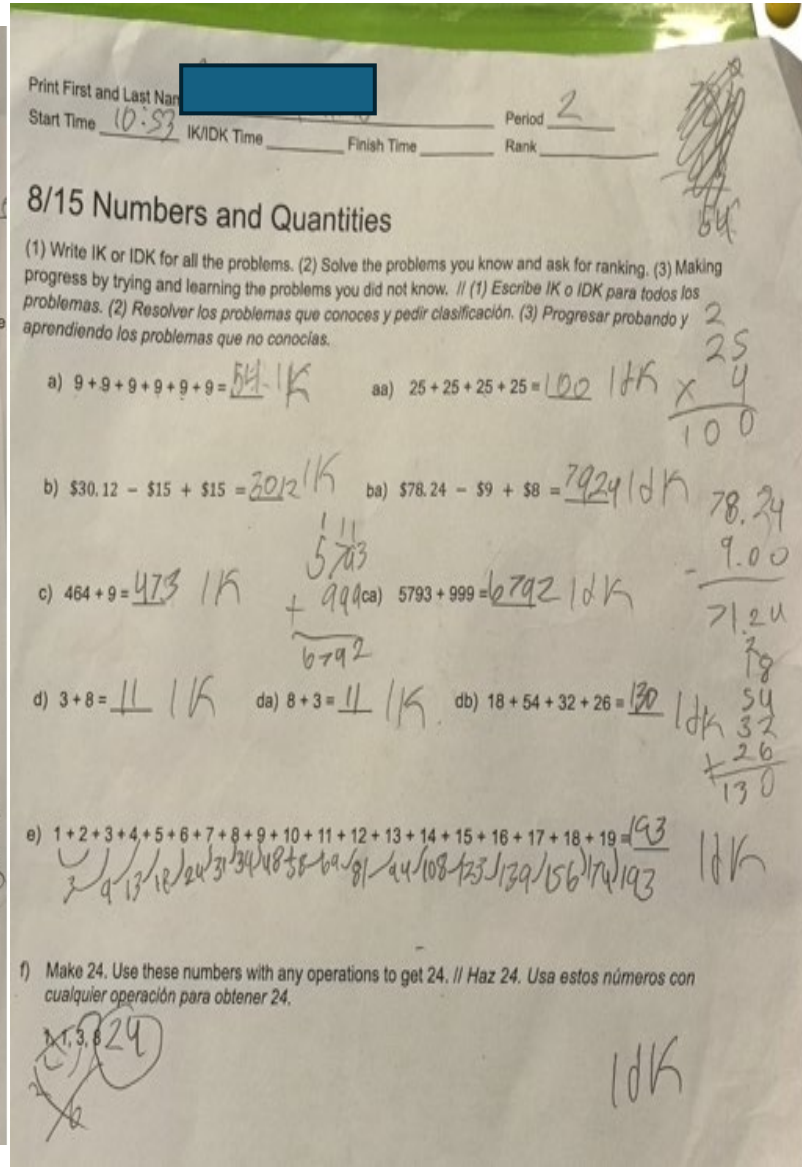
a) 9 + 9 + 9 + 9 + 9 + 9 = 54
b) $30.12 − $15 + $15 = 30.12
c) 464 + 9 = 473
d) 3 + 8 = 11
e) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 = 195

aa) 25 + 25 + 25 + 25 = 100
ba) $78.24 − $9 + $8 = 77.24
ca) 5793 + 999 = 6792
da) 8 + 3 = 11
db) 18 + 54 + 32 + 26 = 130

f) Make 24. Use these numbers with any operations to get 24. *// Haz 24. Usa estos números con cualquier operación para obtener 24.*

1, 1, 3, 8

3 × 8 = 24



Print First and Last Name [redacted] Period 2
Start Time 10:53 IK/IDK Time _____ Finish Time _____ Rank _____

8/15 Numbers and Quantities

(1) Write IK or IDK for all the problems. (2) Solve the problems you know and ask for ranking. (3) Making progress by trying and learning the problems you did not know. *// (1) Escribe IK o IDK para todos los problemas. (2) Resolver los problemas que conoces y pedir clasificación. (3) Progresar probando y aprendiendo los problemas que no conocías.*

a) 9 + 9 + 9 + 9 + 9 + 9 = 54 IK
b) $30.12 − $15 + $15 = 30.12 IK
c) 464 + 9 = 473 IK
d) 3 + 8 = 11 IK
e) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 = 193 IDK

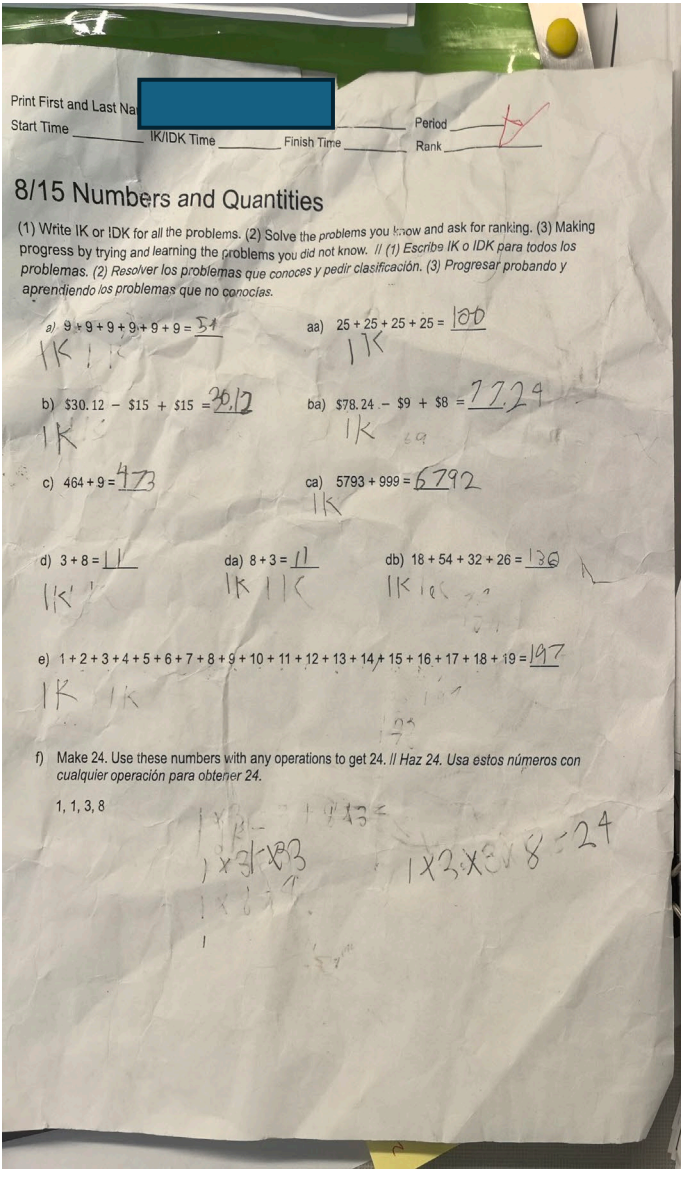
aa) 25 + 25 + 25 + 25 = 100 IDK
ba) $78.24 − $9 + $8 = 79.24 IDK
ca) 5793 + 999 = 6792 IDK
da) 8 + 3 = 11 IK
db) 18 + 54 + 32 + 26 = 130 IDK

f) Make 24. Use these numbers with any operations to get 24. *// Haz 24. Usa estos números con cualquier operación para obtener 24.*

1, 3, 8 24

IDK

The Magical "I Don't Know (IDK)" Method



Print First and Last Name [redacted] Period 4

Start Time _____ IK/IDK Time _____ Finish Time _____ Rank _____

8/15 Numbers and Quantities

(1) Write IK or IDK for all the problems. (2) Solve the problems you know and ask for ranking. (3) Making progress by trying and learning the problems you did not know. *// (1) Escribe IK o IDK para todos los problemas. (2) Resolver los problemas que conoces y pedir clasificación. (3) Progresar probando y aprendiendo los problemas que no conocías.*

a) 9 + 9 + 9 + 9 + 9 + 9 = 54 — IK

aa) 25 + 25 + 25 + 25 = 100 — IK

b) $30.12 − $15 + $15 = 30.12 — IK

ba) $78.24 − $9 + $8 = 77.24 — IK

c) 464 + 9 = 473

ca) 5793 + 999 = 6792 — IK

d) 3 + 8 = 11 — IK

da) 8 + 3 = 11 — IK IK

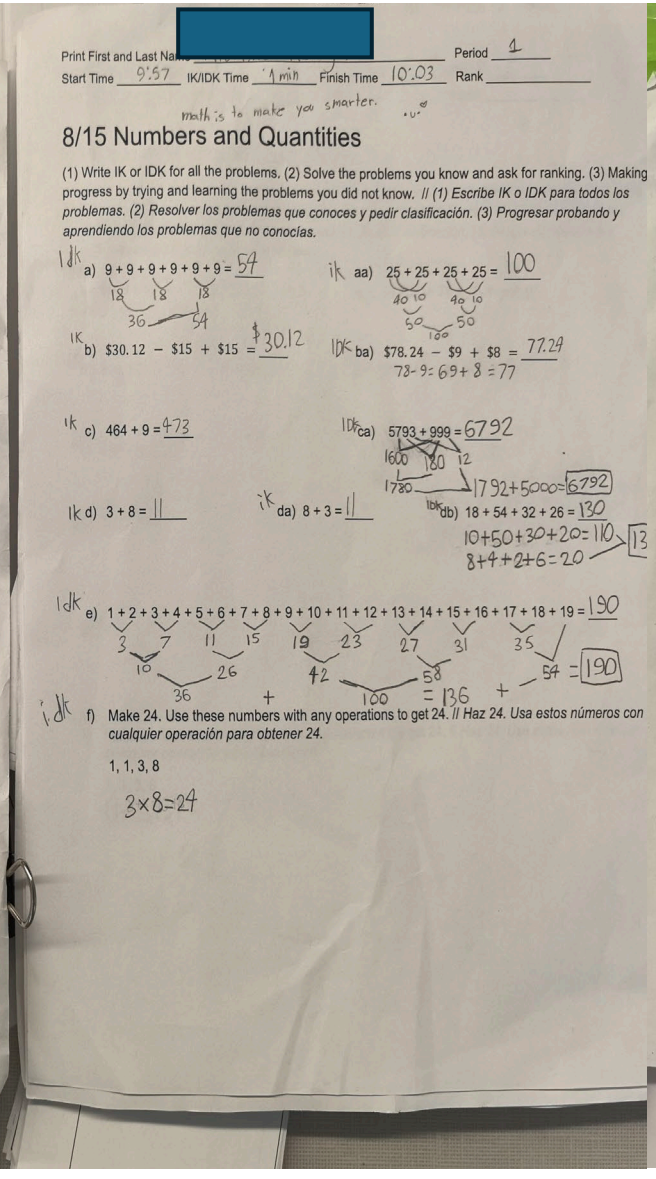
db) 18 + 54 + 32 + 26 = 130 — IK

e) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 = 197 — IK

f) Make 24. Use these numbers with any operations to get 24. *// Haz 24. Usa estos números con cualquier operación para obtener 24.*

1, 1, 3, 8

1 x 3 = 3 — 1 x 3 x 8 = 24



Print First and Last Name [redacted] Period 1

Start Time 9:57 IK/IDK Time 1 min Finish Time 10:03 Rank _____

math is to make you smarter. :)

8/15 Numbers and Quantities

(1) Write IK or IDK for all the problems. (2) Solve the problems you know and ask for ranking. (3) Making progress by trying and learning the problems you did not know. *// (1) Escribe IK o IDK para todos los problemas. (2) Resolver los problemas que conoces y pedir clasificación. (3) Progresar probando y aprendiendo los problemas que no conocías.*

IDK a) 9 + 9 + 9 + 9 + 9 + 9 = 54 (18, 18, 18 → 36, 54)

IK aa) 25 + 25 + 25 + 25 = 100 (40 10, 40 10 → 50, 50 → 100)

IK b) $30.12 − $15 + $15 = $30.12

IDK ba) $78.24 − $9 + $8 = 77.24 (78 − 9 = 69 + 8 = 77)

IK c) 464 + 9 = 473

IDK ca) 5793 + 999 = 6792 (1600, 180, 12 → 1780 → 1792 + 5000 = 6792)

IK d) 3 + 8 = 11

IK da) 8 + 3 = 11

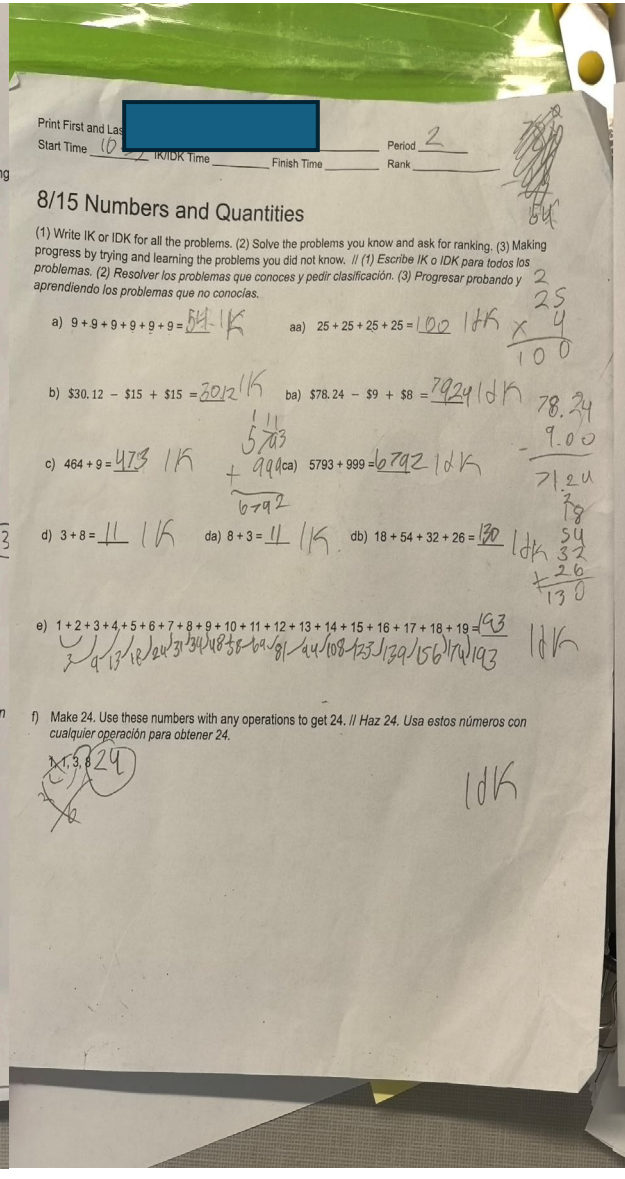
IDK db) 18 + 54 + 32 + 26 = 130 (10 + 50 + 30 + 20 = 110; 8 + 4 + 2 + 6 = 20; 110 + 20 = 130)

IDK e) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 = 190 (3, 7, 11, 15, 19, 23, 27, 31, 35 → 10, 26, 42, 58, 54 → 36 + 100 + 54 = 190)

IDK f) Make 24. Use these numbers with any operations to get 24. *// Haz 24. Usa estos números con cualquier operación para obtener 24.*

1, 1, 3, 8

3 x 8 = 24



Print First and Last Name [redacted] Period 2

Start Time 10 IK/IDK Time _____ Finish Time _____ Rank _____

8/15 Numbers and Quantities

(1) Write IK or IDK for all the problems. (2) Solve the problems you know and ask for ranking. (3) Making progress by trying and learning the problems you did not know. *// (1) Escribe IK o IDK para todos los problemas. (2) Resolver los problemas que conoces y pedir clasificación. (3) Progresar probando y aprendiendo los problemas que no conocías.*

a) 9 + 9 + 9 + 9 + 9 + 9 = 54 — IK

aa) 25 + 25 + 25 + 25 = 100 — IDK

b) $30.12 − $15 + $15 = 30.12 — IK

ba) $78.24 − $9 + $8 = 79.24 — IDK

c) 464 + 9 = 473 — IK

ca) 5793 + 999 = 6792 — IDK

d) 3 + 8 = 11 — IK

da) 8 + 3 = 11 — IK

db) 18 + 54 + 32 + 26 = 130 — IDK

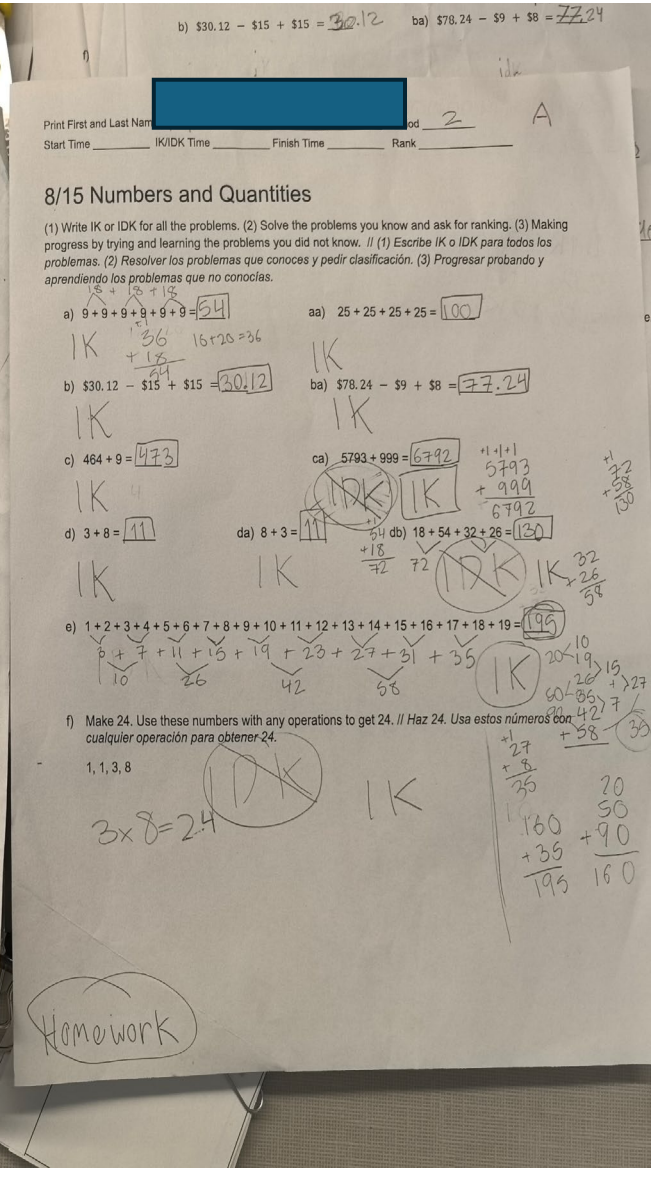
e) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 = 193 — IDK

f) Make 24. Use these numbers with any operations to get 24. *// Haz 24. Usa estos números con cualquier operación para obtener 24.*

1, 3, 8

24

IDK



b) $30.12 − $15 + $15 = 30.12 ba) $78.24 − $9 + $8 = 77.24

Print First and Last Name [redacted] Period 2 A

Start Time _____ IK/IDK Time _____ Finish Time _____ Rank _____

8/15 Numbers and Quantities

(1) Write IK or IDK for all the problems. (2) Solve the problems you know and ask for ranking. (3) Making progress by trying and learning the problems you did not know. *// (1) Escribe IK o IDK para todos los problemas. (2) Resolver los problemas que conoces y pedir clasificación. (3) Progresar probando y aprendiendo los problemas que no conocías.*

a) 9 + 9 + 9 + 9 + 9 + 9 = 54 — IK

aa) 25 + 25 + 25 + 25 = 100 — IK

b) $30.12 − $15 + $15 = 30.12 — IK

ba) $78.24 − $9 + $8 = 77.24 — IK

c) 464 + 9 = 473 — IK

ca) 5793 + 999 = 6792 — IDK IK

d) 3 + 8 = 11 — IK

da) 8 + 3 = 11 — IK

db) 18 + 54 + 32 + 26 = 130 — IDK IK

e) 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11 + 12 + 13 + 14 + 15 + 16 + 17 + 18 + 19 = 195 — IK

f) Make 24. Use these numbers with any operations to get 24. *// Haz 24. Usa estos números con cualquier operación para obtener 24.*

1, 1, 3, 8

3 x 8 = 24 — IDK IK

Homework

Post 8

Without a **rock-solid arithmetic foundation**, teaching middle school math is like building a house on sand.

Mr. Xu broke arithmetic into **17 core parts** and spent the first weeks diagnosing and **fixing every single student's gaps —** no matter how long it took.

He refused to race ahead.

Result? 100% pass rates and state champions.

Proof that every child can master math when the teacher prioritizes real understanding over covering the curriculum.

Bit by Bit: Undoing Years of Misconceptions and Rebuilding Math Foundations

- My students face two major problems coming to my class. First, they've completely lost interest and confidence in math. Second, they believe math belongs to "other people"—Asians, smart kids—not to them.
- So my first task is rebuilding their confidence and helping them believe math is learnable. I don't give the same motivational talk every day, but I constantly reinforce the idea that "math is simple, and you can learn it."
- As for explicit instruction, of course I do it. I don't avoid teaching. But I never give direct instruction until all other approaches have been exhausted. When students truly have no other resources or ideas, that's when I step in.
- Some things must be taught directly—such as the nature of math, its purpose, and the core structure of concepts. These are not things students can derive on their own.
- My success comes from breaking elementary math into a small set of core concepts—nine or sixteen, depending on how you count. A year is enough to truly master these. The hard part is undoing years of misconceptions, not the content itself.
- Complex content must rest on a very solid foundation. If the first hundred floors of a building aren't stable, you can't teach Maxwell's equations, which is like on the 101st floor.
- I mainly teach middle school. Most students arrive without mastery of basic arithmetic, so I start by rebuilding the foundation. After that, the rest is helping them develop their own motivation rather than relying on the teacher forever.
- Math is a structural whole. If the bottom layer is weak, the upper layers cannot stand. If a student understands only 80% in first grade, then 80% of that in second grade which is 64%, by third grade they effectively understand only half. If the foundation is unclear, everything afterward becomes confused.

No Holes Allowed: Practice, Master, and Rebuild Every Foundational Skill from the Ground Up

- Whenever I start with a new batch of middle school students, I first give them a diagnostic test covering addition, subtraction, multiplication, division, decimals, and fractions. In China, this is called a "baseline assessment." I review the students' errors to understand their weak points in basic mathematical concepts. Because math is an interconnected subject, any missing component can make math seem difficult. My job is to identify these missing pieces and help students rebuild a complete chain of mathematical knowledge.
- Arithmetic operations with rational numbers in base-ten are like lenses through which we see mathematics. If there are blurred spots on the lenses, later when you study math, there will be many unclear areas, even some that no amount of effort can clarify. These blurred spots must be cleared first.
- I divide arithmetic into 17 parts: counting, plus four operations (addition, subtraction, multiplication, division) combined with four types of number (positive, negative, fractions, and decimals). I developed detailed plans for all the 17 parts to help students truly master them.
- At the start of each semester, before teaching new material, I spend a lot of time strengthening students' foundations until they are ready to learn new content. Sometimes, they are behind the school's pace by one or two months, even half a semester. I promise the principal that although my students may start behind, by the end of the semester, they will have caught up. Once the basics are mastered, the remaining material can be learned much faster. In the early years, without standardized exams, the principal generally allowed me to proceed, but this approach almost cost me my job.
- At that time, many teachers did not assign homework, but I gave homework every day, with the only exception being Thanksgiving—I jokingly called it "Eat Turkey Homework." Parents questioned me: why assign homework every day? One parent said, "Why make Mexican students do math? She can't, her mother can't, you're making her do it every day—it's a waste of time. My kid has a life!" I told the parent: "Of course your daughter can have a life, but can she not spare even five minutes? Everyone has a life, but they still need to learn math to have a better life."

From Understanding to Mastery: Make Basic Math Automatic and Intuitive

- Math teaches logical structures and reasoning. Although the reasoning is abstract, like language it uses very concrete concepts, with clear structures and explicit rules. These are like vocabulary and grammar in language: they must be memorized and internalized, or one cannot speak fluently. In mathematics, number sequences, addition tables, subtraction tables, multiplication tables, and the procedures for the four operations with rational numbers—these are what I call the "building blocks" of mathematics. They should be mastered to the point of intuition, just like vocabulary, grammar, and language sense. In other words, one should be able to produce answers without deliberately going through the full thinking process.
- For example, fraction multiplication and division are topics that most need to be trained to an intuitive level. Fractions intimidate many students because they seem hard to understand. But that's simply because a fraction is itself a division expression, and multiplying or dividing fractions means performing three operations within one expression. If a student thinks division is not difficult, then doing division again is not a qualitative change—it just requires one more mental step.
- Reaching this level is not hard, but it requires two things: first, truly understanding the concept; second, practicing—or "playing with math"—until it becomes familiar. For these building blocks, there is a distinction between "performing a task" and "understanding it," and then a further step from "understanding" to "mastery."
- In mathematics, basic facts (like multiplication tables), basic operations (like division), basic tasks (like solving linear equations), and word-problem frameworks can also be learned as "chunks." Through deep understanding, repeated practice, linking ideas, and applying them in different contexts, learners can reach a level of fluent, intuitive understanding.

Post 9

Mr. Xu's **secret weapon** was simple: he repaired the broken foundations his middle schoolers arrived with.

Most American kids never get that chance.

Their STEM dreams are **crushed in elementary school**.

The big question: **Why were they so far behind? What's really happening in elementary math?**

Mr. Xu and Yellow Heights saw the painful truth: many elementary teachers are weak in real mathematics and **trained** to **dismiss** strong foundations as "unimportant" — or even harmful to "conceptual understanding."

Even capable teachers are forced into deficient programs.

Hung-Hsi Wu calls this **vicious circle** that has plagued American math education for decades.

Far Too Many US Math Teachers Are Shockingly Weak in Math

Yellow Heights:

- I completed a master's degree in education and obtained a teaching credential. During my graduate program, I realized for the first time that America's approach to K–12 education was completely different from what I had imagined. Many of my classmates—the future middle school math teachers—had struggled with math as students; some even had nightmares about math tests. Working with them on group projects, I realized their math level was quite weak—often weaker than that of the students I coached. The education school did not seem to value mathematical ability; instead, it emphasized social ideals—"using education to create a more equitable world." The program did not truly teach us how to teach math. Most of the curriculum focused on social justice and equity in education rather than instructional methods.
- During my program, I interned at a public middle school in a low-income area. Because it was during the pandemic, all classes were online. Most students rarely spoke in class. Tests were designed to be extremely easy so students could find the correct answers, which made it difficult to assess their actual math levels.
- After graduating, I joined a top-five private high school in my state as a full-time math teacher. The students' math abilities shocked me. Even the most basic linear equations produced a variety of errors. Slightly more complicated multiplication or division would stump many students. Fraction arithmetic seemed like a foreign language to them—as if they had never learned it at all.
- My colleagues' math abilities varied widely. The weakest one co-taught a class with me for two years. She graduated from an Ivy League university and was well-versed in social justice theory, but often did not understand the teaching materials and needed colleagues to explain test questions. Sometimes she relied on pre-recorded videos to teach. What shocked me most was the lack of teacher accountability. The school encouraged teachers to accommodate every kind of student difficulty by making tests easy and grading generously. Students who performed poorly were allowed multiple retakes. The school's "equitable grading" policies kept lowering expectations. Any teacher who dared to give low grades faced pressure from multiple directions. As a result, grades were severely inflated.

Far Too Many US Math Teachers Are Shockingly Weak in Math

- During a teacher training session, a prominent Arizona State University professor held up a Macy's coupon to demonstrate the "power of math." The coupon offered either a $10 rebate or a 15% discount. He asked: if you buy an item for $72.50, which option saves more? Many teachers in the audience couldn't answer. One suggested using a calculator, then mused: "How would it look to use a calculator to check every item? That's embarrassing."
- Many middle school students could not even handle math at the level of first or second grade. For example, nearly 50 percent of students believed that addition must always be performed before subtraction, rather than simply proceeding from left to right.
- This misunderstanding came from a very famous mnemonic their teachers used to explain the order of operations. In English, the first letters of parentheses, exponents, multiplication, division, addition, and subtraction form the word PEMDAS. Some teachers even turn it into a sentence—"Please Excuse My Dear Aunt Sally"—to make it easier to remember.
- Of course, when introducing this mnemonic, teachers also add a footnote: multiplication and division are equal and should be performed from left to right; addition and subtraction are also equal and should be performed from left to right. "Please Excuse My Dear Aunt Sally" is extremely memorable and stays with students for life, while the footnote is easily forgotten. I have met more than one elementary school teacher who insisted that multiplication should come before division and told me that PEMDAS explicitly says so. This "helpful mnemonic" has misled nearly half the students in many public schools.

Hung-Hsi Wu: The Vicious Circle of Flawed K-12 Mathematics Education

- **It's a vicious circle.** As I told you before, school mathematics education has been very bad in America for a long time. When students get out of school, they don't know mathematics, only what is contained in school textbooks, which is unfortunately a flawed version of mathematics.

- When they come to the university, they expect to get help. But no help is forthcoming because our universities make believe that if you graduate from K-12, you already know school mathematics and there is no need to talk about it.

- Thus by the time the undergraduates go back to schools as teachers, they know exactly as much about school mathematics as when they graduated from school. So the flawed version of mathematics gets recycled from generation to generation.

Post 10

It’s not just teachers — the textbooks are terrible too.

Mr. Xu watched “Reform Math” textbook ***Connected Math*** destroy his students. It was one of the most protested books of the 1990s Math Wars — condemned by over 200 mathematicians.

Yet these notorious textbooks are still **widely in use today**.

https://yellowheights.substack.com/p/chapter-5-learning-language-and-math

Michael Xu: How a Reform Math Textbook and Project-based Learning Failed Students

- That textbook, the ***Connected Math Project (CMP)***, was written by professors at **Michigan State University**. Its goal was to help students learn mathematics by connecting problem-solving, reasoning, communication, and conceptual understanding.
- The philosophy was actually quite valid: math should not be detached from life; it should connect to real-world contexts. So the textbook read like a storybook—each lesson began with a narrative that led into the math.
- For example, one lesson described a group planning to bike around a lake. It spent several long paragraphs describing how beautiful the lake was, how they divided into groups, how they set off, and so on—only then did it get to the math: wheel diameter, how to calculate circumference, distance traveled, speed, time, etc. Just getting to the actual math took a long time. Students worked in groups to complete tasks. Only one or two students did the real thinking; the others were busy copying notes. After a week, students had learned very little math, but everyone had "busily engaged in activities," so observers thought the teaching was highly successful: Look, every student is engaged! They're even learning from each other's strengths, because every student has unique insights worth learning from.
- In the end, the district adopted the textbook.
- I insisted on using no more than about 10% of the new textbook. The teacher who served as spokesperson used 80%. Other teachers used between 30% and 50%. The district kept pressuring the principal: every teacher must use the new textbook, and those who don't will be disciplined.
- After one year of using the new textbook, the state standardized test results came out. The teacher who used 80% of the new curriculum had a pass rate of only 10%. My class had a pass rate above 90%. Other teachers also showed the same pattern: the more they used the new textbook, the worse their students performed.
- Yet that textbook continues to be used not only in our district but in many districts across the United States.

Ten Textbooks That Ignited the "Math Wars"

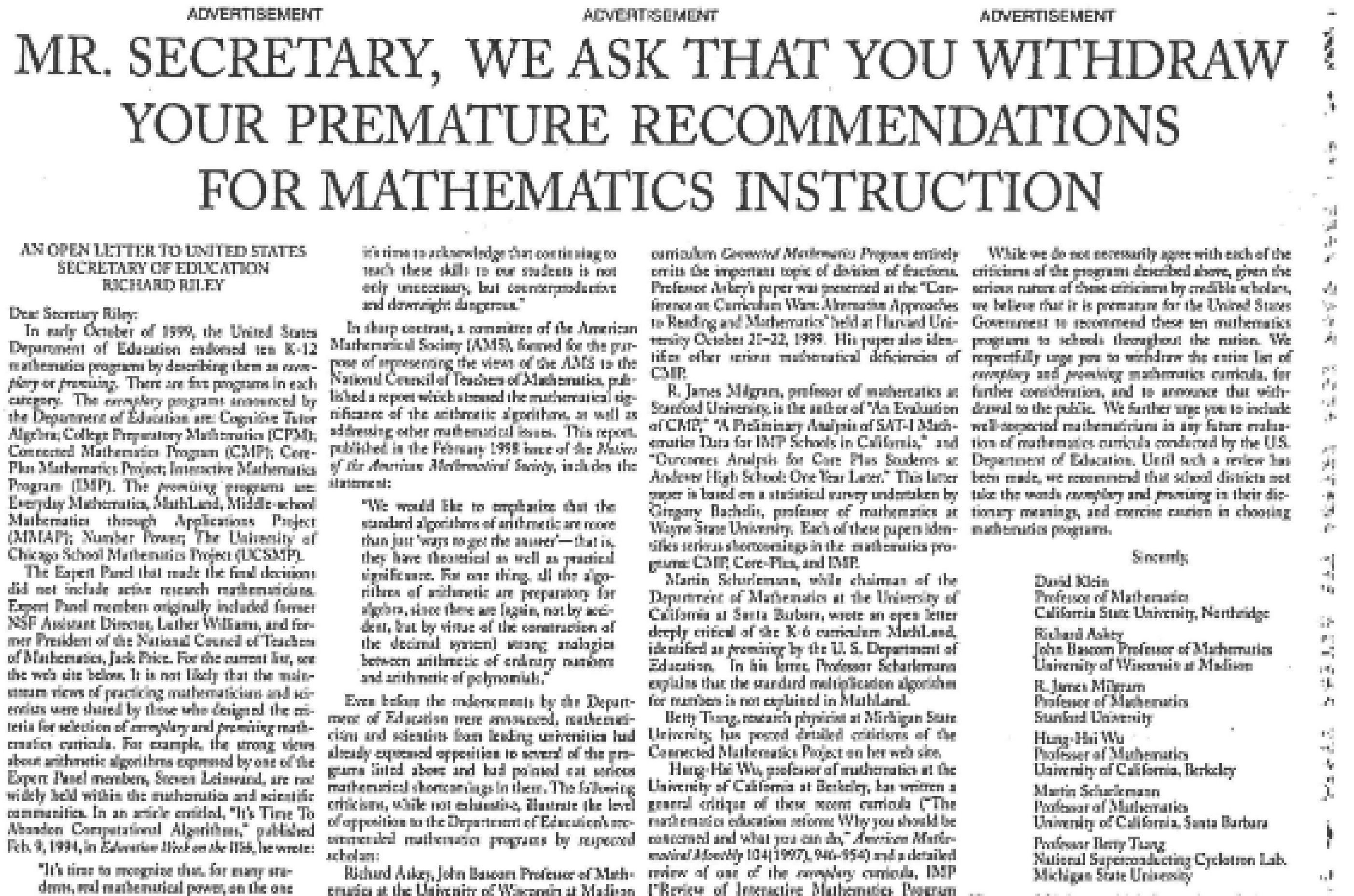
Exemplary:

- Cognitive Tutor Algebra
- College Preparatory Mathematics (CPM)
- Connected Mathematics Program (CMP)
- Core-Plus Mathematics Project
- Interactive Mathematics Program (IMP)

Promising:

- Everyday Mathematics
- MathLand
- Middle-school Mathematics through Applications Project (MMAP)
- Number Power
- The University of Chicago School Mathematics Project (UCSMP)

On Nov. 18, 1999, **220 leading mathematicians and scientists**, including 7 Nobel Laureates and Fields Medalists, issued an open letter to protest against the deficient math textbooks recommended by US Department of Education to nationwide school districts: http://www.csun.edu/~vcmth00m/riley.html



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MR. SECRETARY, WE ASK THAT YOU WITHDRAW YOUR PREMATURE RECOMMENDATIONS FOR MATHEMATICS INSTRUCTION

AN OPEN LETTER TO UNITED STATES SECRETARY OF EDUCATION RICHARD RILEY

Dear Secretary Riley:

In early October of 1999, the United States Department of Education endorsed ten K-12 mathematics programs by describing them as *exemplary* or *promising*. There are five programs in each category. The *exemplary* programs announced by the Department of Education are: Cognitive Tutor Algebra; College Preparatory Mathematics (CPM); Connected Mathematics Program (CMP); Core-Plus Mathematics Project; Interactive Mathematics Program (IMP). The *promising* programs are: Everyday Mathematics, MathLand, Middle-school Mathematics through Applications Project (MMAP); Number Power; The University of Chicago School Mathematics Project (UCSMP).

The Expert Panel that made the final decisions did not include active research mathematicians. Expert Panel members originally included former NSF Assistant Director, Luther Williams, and former President of the National Council of Teachers of Mathematics, Jack Price. For the current list, see the web site below. It is not likely that the mainstream views of practicing mathematicians and scientists were shared by those who designed the criteria for selection of *exemplary* and *promising* mathematics curricula. For example, the strong views about arithmetic algorithms expressed by one of the Expert Panel members, Steven Leinwand, are not widely held within the mathematics and scientific communities. In an article entitled, "It's Time To Abandon Computational Algorithms," published Feb. 9, 1994, in *Education Week on the Web*, he wrote:

"It's time to recognize that, for many students, real mathematical power, on the one [...] it's time to acknowledge that continuing to teach these skills to our students is not only unnecessary, but counterproductive and downright dangerous."

In sharp contrast, a committee of the American Mathematical Society (AMS), formed for the purpose of representing the views of the AMS to the National Council of Teachers of Mathematics, published a report which stressed the mathematical significance of the arithmetic algorithms, as well as addressing other mathematical issues. This report, published in the February 1998 issue of the *Notices of the American Mathematical Society*, includes the statement:

"We would like to emphasize that the standard algorithms of arithmetic are more than just 'ways to get the answer'—that is, they have theoretical as well as practical significance. For one thing, all the algorithms of arithmetic are preparatory for algebra, since there are (again, not by accident, but by virtue of the construction of the decimal system) strong analogies between arithmetic of ordinary numbers and arithmetic of polynomials."

Even before the endorsements by the Department of Education were announced, mathematicians and scientists from leading universities had already expressed opposition to several of the programs listed above and had pointed out serious mathematical shortcomings in them. The following criticisms, while not exhaustive, illustrate the level of opposition to the Department of Education's recommended mathematics programs by respected scholars:

Richard Askey, John Bascom Professor of Mathematics at the University of Wisconsin at Madison [...] curriculum *Connected Mathematics Program* entirely omits the important topic of division of fractions. Professor Askey's paper was presented at the "Conference on Curriculum Wars: Alternative Approaches to Reading and Mathematics" held at Harvard University October 21–22, 1999. His paper also identifies other serious mathematical deficiencies of CMP.

R. James Milgram, professor of mathematics at Stanford University, is the author of "An Evaluation of CMP," "A Preliminary Analysis of SAT-I Mathematics Data for IMP Schools in California," and "Outcomes Analysis for Core Plus Students at Andover High School: One Year Later." This latter paper is based on a statistical survey undertaken by Gregory Bachelis, professor of mathematics at Wayne State University. Each of these papers identifies serious shortcomings in the mathematics programs: CMP, Core-Plus, and IMP.

Martin Scharlemann, while chairman of the Department of Mathematics at the University of California at Santa Barbara, wrote an open letter deeply critical of the K-6 curriculum MathLand, identified as *promising* by the U. S. Department of Education. In his letter, Professor Scharlemann explains that the standard multiplication algorithm for numbers is not explained in MathLand.

Betty Tsang, research physicist at Michigan State University, has posted detailed criticisms of the Connected Mathematics Project on her web site.

Hung-Hsi Wu, professor of mathematics at the University of California at Berkeley, has written a general critique of these recent curricula ("The mathematics education reform: Why you should be concerned and what you can do," *American Mathematical Monthly* 104(1997), 946–954) and a detailed review of one of the *exemplary* curricula, IMP ("Review of Interactive Mathematics Program [...]

While we do not necessarily agree with each of the criticisms of the programs described above, given the serious nature of these criticisms by credible scholars, we believe that it is premature for the United States Government to recommend these ten mathematics programs to schools throughout the nation. We respectfully urge you to withdraw the entire list of *exemplary* and *promising* mathematics curricula, for further consideration, and to announce that withdrawal to the public. We further urge you to include well-respected mathematicians in any future evaluation of mathematics curricula conducted by the U.S. Department of Education. Until such a review has been made, we recommend that school districts not take the words *exemplary* and *promising* in their dictionary meanings, and exercise caution in choosing mathematics programs.

Sincerely,

David Klein
Professor of Mathematics
California State University, Northridge

Richard Askey
John Bascom Professor of Mathematics
University of Wisconsin at Madison

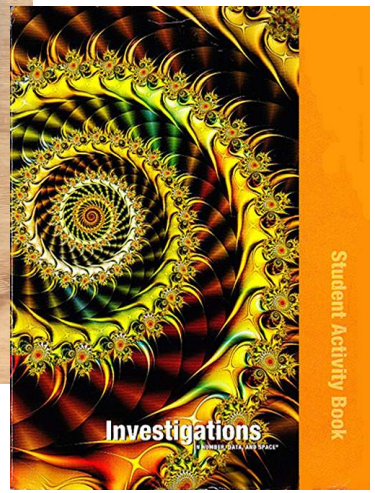
R. James Milgram
Professor of Mathematics
Stanford University

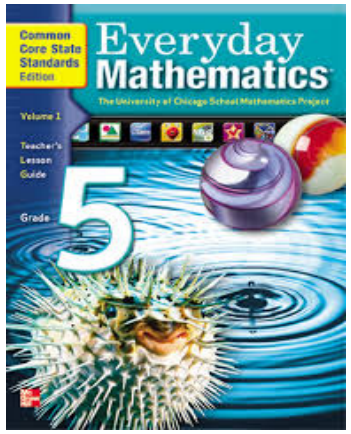
Hung-Hsi Wu
Professor of Mathematics
University of California, Berkeley

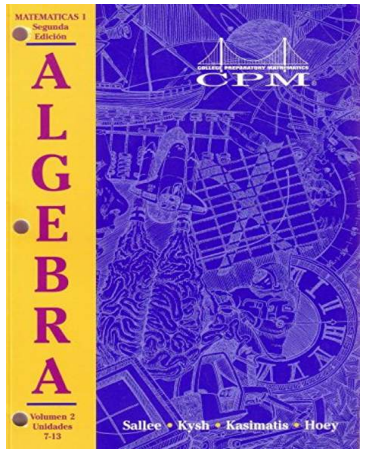
Martin Scharlemann
Professor of Mathematics
University of California, Santa Barbara

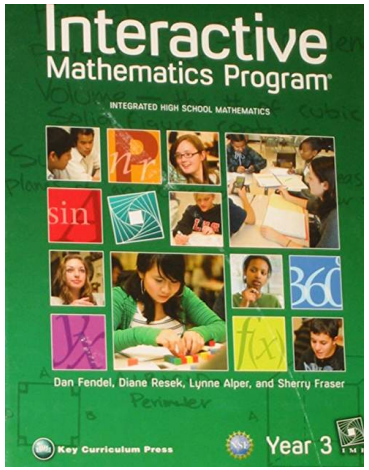
Professor Betty Tsang
National Superconducting Cyclotron Lab.
Michigan State University

Reform Math Textbooks Devastate U.S. Students' Math Achievement







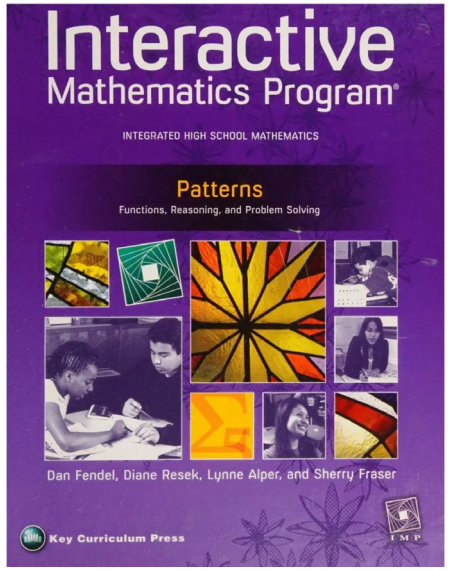


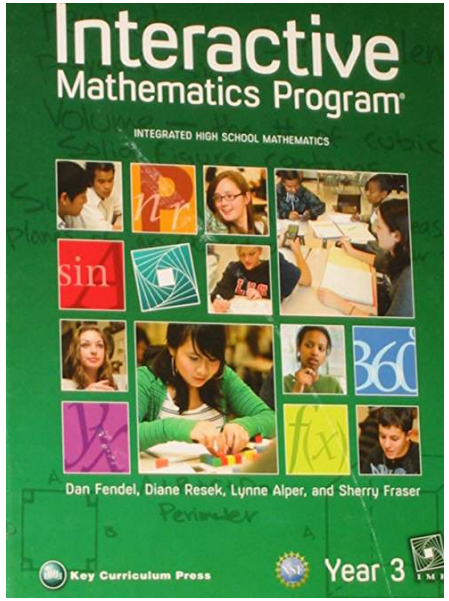
Excerpts from the Wall Street Journal Editorial of January 4, 2000

- Next comes ***Connected Math***, another panel favorite. It too skips or glosses over crucial skills. Example: The division of fractions, an immutable prerequisite for algebra, is absent from its middle-school curriculum.
- ***Everyday Math*** ensures juvenile dependency to calculators by endorsing their use from kindergarten. Rather than teach long division, the program devotes substantial time to that important area of math study, self-esteem.
- The reason for the New New Math, as for many other curriculum reforms, is that teachers, school administrators and their unions are tired of being blamed for statistical declines and poor student performances.
- Or, as Professor Klein translates: "Underlying their programs is an assumption that minorities and women are too dumb to learn real mathematics."
- New Math will take its casualties, especially among the poor, adding to the already mounting costs of the decline in national educational standards.

http://www.mathematicallycorrect.com/wsj.htm

Hung-Hsi Wu's Critique: The Mathematical Deficiencies of *Interactive Mathematics Program*





- "I have never seen mathematics like that." To me, mathematics is very clear and very solid, with clear-cut theorems and clear-cut proofs. … But this textbook goes on and on. Everything is informal; it almost never gives a precise definition. It avoids using symbols as much as possible because it prefers verbal expressions over symbolic statements.
- Moreover, its exposition is often of the following variety: Using a calculator, they get the answer to a real-world problem by some naive reasoning; but once the real-world problem is solved, they do not go back to give mathematical context to the reasoning behind the use of the calculator. In other words, this was not a textbook that brought mathematical closure to its mathematical discussions.
- *The disturbing aspects IMP:*
  - *(a) The almost total absence of drills.*
  - *(b) The inability of the IMP text to follow through in its presentation of new ideas.*
  - *(c) The misrepresentation of mathematics through the abuse of open-ended problems and the de-emphasis of correct answers.*
  - *(d) The presentation of mathematical puzzles (also known as brain-teasers) as straight mathematics.*
  - *(e) The refusal to acknowledge that mathematics could be inspired by abstract considerations.*
  - *(f) Insufficient emphasis on precision.*
  - *(g) Over-emphasis on group activities.*

Post 11

Incompetent teaching + terrible textbooks = perfect storm.

The disaster is now **baked into the system**.

In 1992, mathematician Hung-Hsi Wu felt like he was watching kids drown while standing helpless on the riverbank.

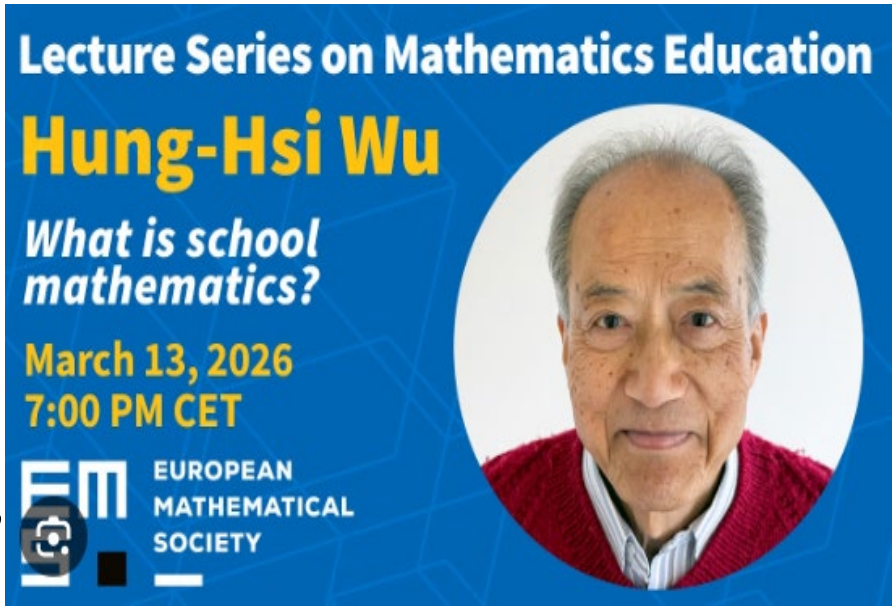
He called Reform Math a **nightmare**.

In 2026 he lamented: “For the last at least **seven decades**… the mathematics in American schools has been **basically completely unlearnable.**”

https://www.youtube.com/live/t7KUhlJ55Sc?si=Wl0_Rbef08fS2EIX

Hung-Hsi Wu: American School Mathematics Has Been Fundamentally Unlearnable

- **“For the last at least seven decades, probably more, the mathematics in American schools has been basically completely unlearnable.”**
- “Textbook School Mathematics (TSM) has very few definitions that make any sense.”
- “What’s in TSM is not a continuous development, by virtue of reasoning, of various topics, but a collection of isolated, unexplained procedures, just like cookbook recipes.”
- “Very unfortunately, in American schools, children in grades 1, 2, 3, 4 learn these algorithms completely by rote. There is hardly any reasoning supplied. Like cookbooks, just learn how to do it.”
- Fractions are vaguely called “part of a whole,” “piece of pizza,” or “ratio” — none of which make sense to children or explain operations.
- On high school geometry: “This course… is one of the main reasons for mathematics phobia.” “This is a tremendous betrayal and so mathematics phobia.”
- TSM lacks definitions, reasoning, precision, coherence, and purpose — making it fundamentally unlearnable and harmful to students.



Hung-Hsi Wu:
The Corruption of School Mathematics Is Intolerable

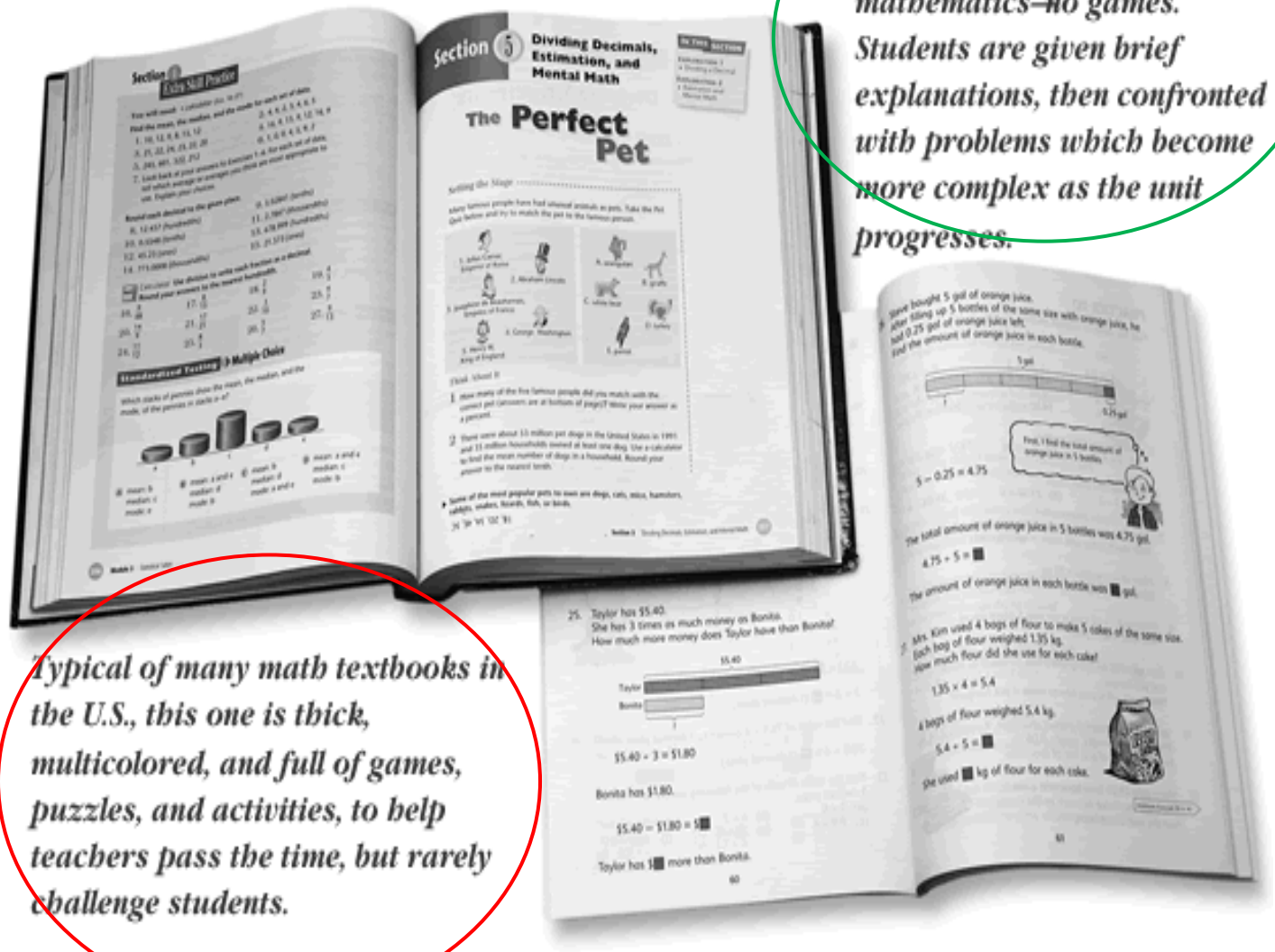
https://math.berkeley.edu/~wu/Interview-MM.pdf 2010

- "School mathematics education is 80 percent politics and only 20 percent intellect."
- "I felt as if I was in a nightmare and I was walking by a river and someone was drowning and yelling for help, and all I could do was stand on the river bank and watch in helpless horror."
- "I have never seen mathematics like that… Everything is informal; it almost never gives a precise definition. It avoids using symbols as much as possible… it was not a textbook that brought mathematical closure to its mathematical discussions."
- "**It enraged me to see a group of people going out of their way to, so to speak, corrupt mathematics**."
- Textbooks "misrepresent mathematics in the sense that they fail to do, in a consistent manner, one or more of the following: (1) give precise enunciations of definitions… (2) provide reasoning… (3) delineate the place of each concept… (4) show students the mathematical purpose…"
- "The quality of the available textbooks was **incredibly low**."

How Reform Math Hollowed Out Real Math Learning

What Has Happened to US Mathematics Education http://www.mathematicallycorrect.com/intro.htm

- Across the country, the way mathematics is taught in the classroom and in textbooks has been changing notably. Classrooms are often organized in **small groups** where students ask each other questions and the teacher is discouraged from providing information. Students may even **take tests in groups**, if they have tests at all. The use of blocks and other **"manipulative"** objects has extended well beyond kindergarten and can now be found in many algebra classes. Meanwhile, the students practice their fundamentals less and less. Time consuming **projects and essays that involve very little mathematics** are the rage. **Calculator** use is growing and taking away expectations for student learning. Textbooks, if the students have them at all, are full of color pictures and stories, but not full of mathematics. The books often don't even give explicit definitions or procedures. That would be "telling" and the new idea is for students to discover all of mathematics for themselves. Many of these programs don't even teach the standard algorithms for the operations of arithmetic. Long division is a devil that is to be beaten into extinction - and if they manage that, multiplication will be next.
- Along with the emphasis on non-traditional methods, we are offered a lot of **rhetoric about higher order thinking and problem solving**. There have been countless diatribes that rant about the evils of repeated practice and remembered facts and a steady stream of self-endorsements of the new directions. The selling of the so-called *reform* has been well-rehearsed by its proponents over the last decade. Replete with glossy promotions, the *new new math* is **long on salesmanship but short on mathematics**.



Singapore Math' s textbook is thin, and contains only mathematics–no games. Students are given brief explanations, then confronted with problems which become more complex as the unit progresses.

Typical of many math textbooks in the U.S., this one is thick, multicolored, and full of games, puzzles, and activities, to help teachers pass the time, but rarely challenge students.

The New York Times

Another pop quiz:

A piece of wood was 40 centimeters long. It was cut into 3 pieces. The lengths in centimeters are 2x -5, x +7 and x +6. What is the length of the longest piece?

Only 7 percent of American eighth graders got that one right (the answer is 15 centimeters). In contrast, 53 percent of Singaporean eighth graders answered correctly.

Which problem do you want your child doing?

Sample Investigations Math Problem (5th or 6th grade suitable)

Suppose you get 6 cents for each bottle you return for recycling. For each problem show how you found your solution.

1) You have collected 149 bottles. How much will you earn?

Sample Singapore Math Problem (5th grade)

Adam bought 8 note pads at $1.45 each and 10 towels. He gave the cashier $100 and received $46 change. Find the cost of a towel.

Post 12

In 1992, Hung-Hsi Wu wrote:

“It **enraged** me to see a group of people going out of their way to dumb down the curriculum.”

The dumbing down began with the progressive pioneers in the early 20th century.

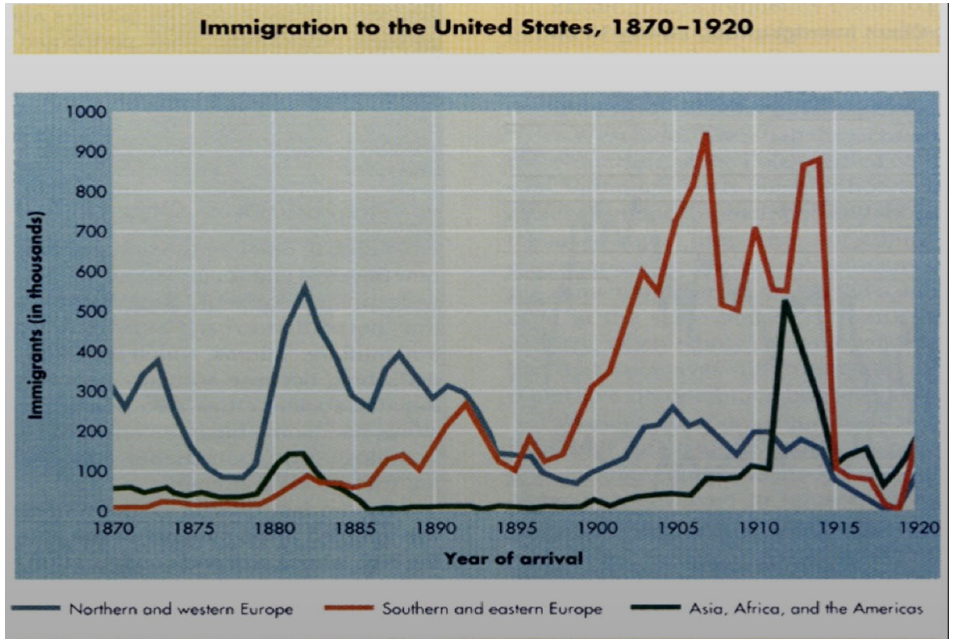
The movement they led was **never an accident**.

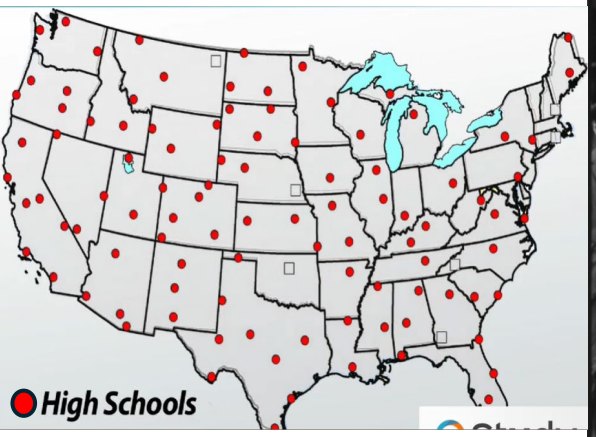
It was **deliberately** built on elitist roots during the 1880–1920 immigration wave.

Elites faced a **dilemma**: what education for the “ordinary masses”?

Their answer: Not the rigorous kind we give our own children.

The Backdrop of Progressive Education Movement





❖ **The Great Wave of Immigration (1880–1920)**

- Total: ~27 million immigrants
- Peak Years (1900–1914): Over 20 million arrivals
- Major Shift in Origins:
  - Pre-1880: Mostly Northern & Western Europe
  - 1890–1919: Over 60% from Southern & Eastern Europe (Mostly unskilled and impoverished)

❖ **The "High School Movement"**

Explosive expansion of secondary education

Year	1900	1910	1920	1930	1940
% of 14–17-year-olds Enrolled in High School	11%	18%	32%	47%	73%

❖ **Rapid industrialization** created an urgent demand for a large, disciplined factory workforce.

Core Dilemma for Elites and Progressive Educators:

What kind of education should we give to the children of the ordinary masses?

Progressive Education: Elitist Roots, Privilege-Preserving Goal

The turn of the 20th century saw high schools mushrooming nationwide, fretting the progressive elites with a soul-searching question: should high schools offer the same high-standard courses originally serving only elite students to children from ordinary families?

Excerpts from "The Teaching of History" by Walter Karp (1980) https://sourcetext.com/textbook-america/

- Throughout history, the managers of states have with remarkable consistency defined good citizenship as **a rather small degree of knowledge** of, and participation in, public affairs.
- National Education Association: … the danger of educating people beyond their station, leading them "away from the pursuits for which they are adapted."
- J. E. Russell, head of Columbia University Teachers College: "How can we justify our practice in schooling the masses in precisely the same manner as we do those who are to be their leaders?"
- Harvard chancellor Charles W. Eliot urged teachers to "sort" students by their "evident or probable destinies."
- Princeton chancellor and 28th US President Woodrow Wilson: We want one class of persons to have a liberal education and we want another class of persons, a very much larger class of necessity in every society, to forgo the privilege of a liberal education and fit themselves **to perform specific difficult manual tasks**.
- Douglas Commission: Since there was no way to stop "the masses" from entering high school, the only way to meet the crisis, in short, was to **prevent them from learning anything liberating when they got there.** The new secondary schools should offer **vocational training** in particular and something called **industrial education** in general. Teachers should regard their pupils not as future citizens but as future working hinds.
- John Dewey's "realism": … they have supplied educational leaders with the lasting framework for a pedagogical system designed to **prevent "the masses" from ever learning in a classroom what a free people ought to know.** Democracy, according to Dewey, was "primarily a mode of associated living," which for most Americans chiefly meant **working together in factories**. Having stripped democracy of its political character, Dewey and his colleagues, who prided themselves on their "realism," went on to redefine it as "industrial cooperation." **With this new, "realistic" definition, they effected a permanent pedagogical revolution.**

Progressive Education: Elitist Roots, Privilege-Preserving Goal

- "...our schools have been scientifically designed to prevent overeducation from happening."
  -- William Troy Harris, U.S. Commissioner of Education 1889-1906

- "Far too many people in America, both in and out of education, look upon the elementary school as a place to learn reading, writing and arithmetic."
  -- Association for Supervision and Curriculum Development, National Education Association Yearbook, 1947

- "When we come to the realization that not every child has to read, figure, write and spell ... that many of them either cannot or will not master these chores, then we will be on the way to improving the junior high curriculum."
  -- A.H. Lauchner, National Association of Secondary School Principles,1951

- "In our dreams, we have limitless resources and the people yield themselves with perfect docility to our molding hands. The present education conventions fade from their minds, and unhampered by tradition, we work our own good will upon a grateful and responsive rural folk. We shall not try to make these people or any of their children into philosophers or men of learning, or men of science. We have not to raise up from among them authors, editors, poets or men of letters. We shall not search for embryo great artists, painters, musicians nor lawyers, doctors, preachers, polititians, statesmen, of whom we have an ample supply. The task we set before ourselves is very simple as well as a very beautiful one, to train these people as we find them to a perfectly ideal life just where they are. So we will organize our children and teach them to do in a perfect way the things their fathers and mothers are doing in a imperfect way, **in the homes, in the shops and on the farms**."
  -- **Frederick Taylor Gates**, principal business advisor to John D. Rockefeller and president of General Education Board

Post 13

Progressive pioneers were **brutally honest**.

They declared intelligence **fixed, hereditary, and unequally distributed** by race and gender.

Leaders like Terman, Thorndike, and Hall called Black, Mexican, and immigrant children inherently “dull.”

They built a **two-tiered** system: real academics for the elite, low-rigor “practical” training for everyone else.

That **racist, elitist** foundation still shapes today’s progressive education.

Progressive Scholars' Racist and Gender-Biased Views on Intelligence

Lewis Terman (Creator of Stanford-Binet IQ Test)

- "High-grade or border-line deficiency… is very, very common among Spanish-Indian and Mexican families… and also among negroes. Their dullness seems to be racial… They cannot master abstractions but they can often be made into efficient workers."
- He also estimated a median IQ of about 80 for Italian, Portuguese, and Mexican children in California.
- Accepted prevailing views of meaningful sex differences in intellectual abilities; believed women were limited in high-level abstract reasoning.

Edward Thorndike (Father of Educational Psychology, Columbia University)

Intelligence is largely hereditary; large portions of the population have limited capacity for abstract learning.

"Instincts will produce sure and important differences between the mental and moral activities of boys and girls."

Ellwood Cubberley (Stanford Dean of Education)

- "These Southern and Eastern Europeans… are illiterate, docile… likely to dilute the quality of our national stock."

Henry H. Goddard (Psychologist)

- "The intelligence of the average 'south European' immigrant is low… two out of every five were feebleminded."

Carl Brigham (Creator of early SAT)

- "The average Negro child cannot advance much beyond the third or fourth grade… The Nordic race stands at the head of the list [of intelligence]."

G. Stanley Hall (Founder of APA)

- Women were biologically unsuited for rigorous intellectual endeavor and should be educated primarily for homemaking and motherhood.

Common View

Intelligence is fixed, hereditary, and unequally distributed by race, ethnicity, and gender.

Taylorism & “Social Efficiency” in Progressive Education

Progressive educators applied Frederick Taylor’s Scientific Management (factory efficiency model) directly to schools:

- Schools = Factories
  Children = raw material
  Teachers = workers
  Graduates = standardized products
- Goal: Maximize efficiency and eliminate “educational waste”

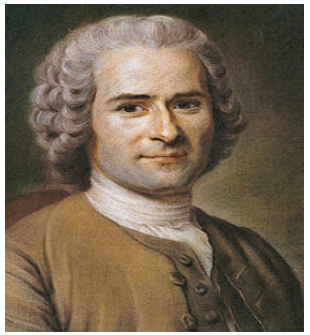
Key Argument for Low-Quality Education for the Masses:

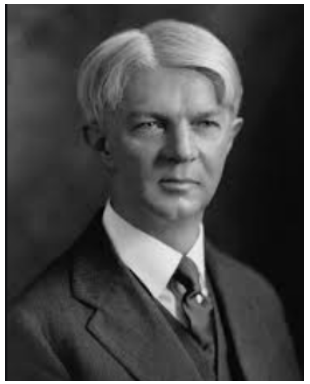
- Most children (especially poor immigrants) were seen as having limited innate intelligence.
- Giving them rigorous academic education was **inefficient**.
- Solution: Sort students by ability → provide vocational/practical training for the majority.

Ellwood Cubberley (Stanford Dean of Education):

- “Our schools are, in a sense, factories in which the raw products (children) are to be shaped and fashioned into products to meet the various demands of life.”

Progressive Education: Rooted in Anti-Intellectualism





Jean-Jacques Rousseau (Philosopher, 1762)

- "The advancement of science, arts, and civilization does not improve human beings — it corrupts natural human goodness, virtue, and morality."

William Heard Kilpatrick (Leading Progressive Educator)

- Knowledge changes too fast to be transmitted usefully. Instead of teaching "dead facts and figures," schools should teach "critical thinking."
- The study of algebra and geometry in high school should be discontinued except as an intellectual luxury. Mathematics is harmful rather than helpful to the kind of thinking necessary for ordinary living.

David Snedden (Prominent Progressive Educator)

- "Algebra… is a nonfunctional and nearly valueless subject for 90 percent of all boys and 99 percent of all girls — and no changes in method or content will change that."

Abraham Flexner (Progressive Reformer, 1916)

- "It is, therefore, useless to inquire whether a knowledge of Latin and mathematics is valuable… Traditional esteem is an insufficient offset to present and future uselessness."

The Rationale of US Progressive Education Model

Rousseau's Ideology

- Romantic, **child-centered** "natural education"
- **Collectivism**: subordinates the individual to national/group interests
- **Equality of outcomes** (instead of opportunities)

Progressive Pioneers' Convictions:

- **Elitism**: Rigorous academics only for the gifted elite
- **Anti-intellectualism**: Traditional knowledge is useless for the masses
- **Racism & Sexism**: Innate intelligence differences by race and gender
- **Social Efficiency (Taylorism):** Schools as factories to sort students for industrial roles and curriculum that eliminates educational "waste"

Resulting Doctrines:

- **Student-centered education** (discovery learning, projects, group work)
- **Equity: closing achievement gaps by** lowering standards and holding back high achievers
- Two-tiered system: elite academics for the few vs. low-rigor education for the majority
- Traditional rigorous education (especially math) is viewed as **socially unjust, racist, and elitist** because it is beyond the reach of "innately less-intelligent" minorities and women.

Post 14

This elitist, racist vision became the official DNA of American education.

For over a century, progressive reformers' mission has never changed: **dilute Algebra, Calculus, and advanced math, and train the masses for practical living only.**

Only the slogans evolve — "life-adjustment," "relevant," "real-world," and now "data science."

Today tech tycoons pour billions into "modernizing math." Blind to Reform Math's evil roots, they claim to advance "equity" — yet they perpetuate the soft bigotry of low expectations.

The Great Dumbing Down is still running at full speed.

Timeline: Progressive Education's Dumbing-Down Trend and Key Leaders

- **1890s–1930s: Progressive Movement** (Dewey, Thorndike, Kilpatrick, Terman, Cubberley)
  Promoted student-centered "learning by doing" over traditional academic rigor.
- **1930s: Activity Movement** (Kilpatrick)
  Replaced subjects with projects and hands-on activities.
- **1940s: Life Adjustment Movement** (Prosser & NEA)
  Prioritized "real-life" skills for the masses instead of academics.
- **1956: Bloom's Taxonomy** (Bloom)
  Labeled knowledge and facts as "lower-order" thinking.
- **1960s: Discovery Learning & Constructivism** (Bruner, Piaget)
  Students must "construct" or discover knowledge themselves.
- **1970s: Open School Movement (**Herbert Kohl)
  Unstructured, self-directed learning.
- **1980s–1990s: NCTM Standards** (NCTM & NSF, Marc Tucker)
  Emphasized "conceptual understanding" over skills and proof.
- **2010s: Common Core** (Marc Tucker, Phil Daro)
  Continued progressive dogmas; set Algebra 1 as graduation requirement.
- **2021–present: New California Math Framework** (Jo Boaler)
  Repackaged old dogmas (real-world tasks, data science to bypass algebra) under "equity"; discouraged early acceleration and traditional rigor.

Current Progressive Educators Carry On the Great Dumbing-Down Mission

Alan Schoenfeld
(*Distinguished Professor, UC Berkeley*) describes the traditional curriculum as **elitist** and portrays the math wars as a battle between equality and elitism: **"the traditional curriculum bore the recognizable traces of its elitist ancestry: the traditional curriculum was a vehicle for . . . the perpetuation of privilege.** . .Thus the Standards could be seen as a threat to the current social order. . the traditional curriculum, with its filtering mechanisms and high dropout and failure rates (**especially for certain minority groups**) has had the effect of putting and keeping certain groups 'in their place'."

- "lack of access to mathematics is a barrier – a barrier that leaves people socially and economically disfranchised."

Marc Tucker
(*Chief Architect of Common Core*):
The high school mathematics curriculum is now centered on the teaching of a sequence of courses leading to calculus that includes Geometry, Algebra II, Pre-Calculus and Calculus. However, fewer than five percent of American workers and an even smaller percentage of community college students will ever need to master the courses in this sequence in their college or the workplace. For most of our students, those 'high' standards in mathematics constitute a requirement to learn material **they will never need, either in college or later in their work**, a bit like the requirement a century ago to learn Latin in high school.

Billionaire Foundations Fuel Progressive Education

Chan Zuckerberg Initiative (CZI)

- Priscilla Chan and CZI invested over $100 million in Summit Learning
- Program promotes personalized playlists, project-based expeditions, and whole-child mentoring
- Explicitly pushes “whole-child personalized learning” as the future of education

Emerson Collective (Laurene Powell Jobs)

- Launched XQ Institute with $100 million+ to “rethink and transform” American high school
- Promotes competency-based learning, personalized pathways, project-based expeditions, and moving away from traditional Algebra 2 / Calculus tracks
- Focus: “equity,” “real-world skills,” and replacing seat-time with mastery-based progress

Jo Boaler's Stanford Campaign to Dismantle Algebra and Calculus

Should we stop teaching Geometry and Algebra?

Collapse all (1)

Jo Boaler 06:18 PM

we are setting out intergrated pathways in the framwork, hoping to retire the alg-geom courses

Stanford Summit – February 2nd 2020

Jo Boaler led the summit to discuss displacing Algebra 2 with "data science."

Is it time to kill calculus?

Math curricula are designed to shepherd students toward calculus. Some mathematicians think this path is outdated

OPINION | STEM

Let's Make Math Education Relevant for Real Life

By Pamela Burdman Oct 26, 2020

Los Angeles Times

Opinion: Modern high school math should be about data science — not Algebra 2 By JO BOALER, STEVEN D. LEVITT

THE WALL STREET JOURNAL.

THE MOVEMENT TO MODERNIZE MATH CLASS

'Freakonomics' co-author Steven Levitt and other reformers are pushing for more equitable curriculum that better equips students for a data-driven world

Post 15

Buzzwords change, but the mission never does.

From John Dewey to Marc Tucker, and from William Heard Kilpatrick to Jo Boaler, the playbook is the same: invent new gimmicks, then dilute real mathematical learning for ordinary kids.

Their elitist and racist convictions have never disappeared: most ordinary students “don’t need” advanced math — and disadvantaged kids especially can’t master it.

The EdSpeak (Terminology of Educational fads):

learning by doing, experiential learning, critical thinking, higher-order thinking, problem-solving, teamwork, group work, conceptual understanding, personalized learning, project-based, discovery learning, constructivism, inquiry based, integrated, self-paced learning, student-centered learning, mastery learning, project-based learning, deeper learning, and 21st century skills …

The New EdSpeak in the 2021 CMF:

Open tasks, rich problems, low-floor & high-ceiling questions, big ideas, visual math, multi-dimensional learning, multi-dimensional assessment, formative assessment, authentic problems, real-world tasks, equitable math, problem-solving, culturally relevant pedagogy, culturally responsive teaching, culturally sustaining pedagogy, and growth mindsets (often misused by math reformers to justify no mistake correction, no timed tests, and so forth) …

Terminology Every Parent Must Understand
https://www.illinoisloop.org/lingo.html
https://www.illinoisloop.org/buzzwords.html

Anna Stokke (2015):

These phrases are often interchanged to avoid criticism of certain pedagogical techniques, an approach that was recently used in Alberta. After a well-informed journalist for the *Edmonton Journal* wrote about the lack of evidence for **discovery-based instruction**, education officials argued that Alberta Education was actually promoting **inquiry-based learning**.

Reform Math vs. Traditional Math

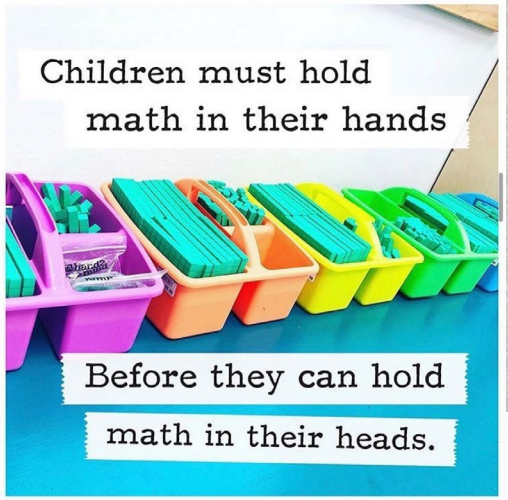
Aspect	Reform Math (Constructivist)	Traditional Math
Philosophy	Students construct/discover knowledge themselves	Teacher directly teaches concepts & procedures
Focus	Conceptual understanding, real-world problems	Procedural fluency & symbolic mastery
Teaching Style	Discovery, projects, group work	Direct instruction & guided practice
Tools	Manipulatives, calculators, open-ended tasks	Pencil-and-paper, algorithms, drills
Teacher Role	Facilitator / guide on the side	Sage on the stage
Assessment	Portfolios, authentic assessment, holistic rubrics	Timed tests, objective questions, one correct answer
Curriculum Design	Incoherent, spiraling, mile-wide & inch-deep	Coherent, logical, hierarchical
Goal	Engagement, equity, and math appreciation	Mastery of essential knowledge & skills, mathematical thinking

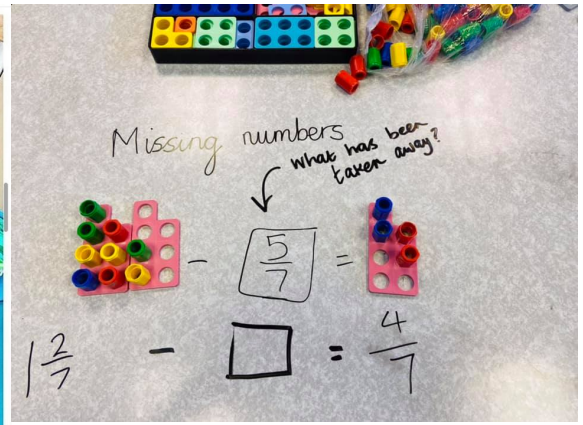
Post 16

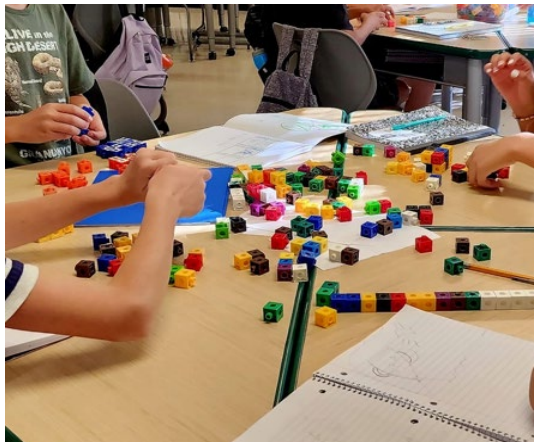
The damage starts early — in elementary school.

Kids waste time on scissors, drawings, and group projects instead of building real math skills.

Mr. Xu explains: “Mathematics is **a deeply internal and independent thinking process**. Group activities often become **distractions**. Once the individual mind is interrupted, it is very difficult to resume.”

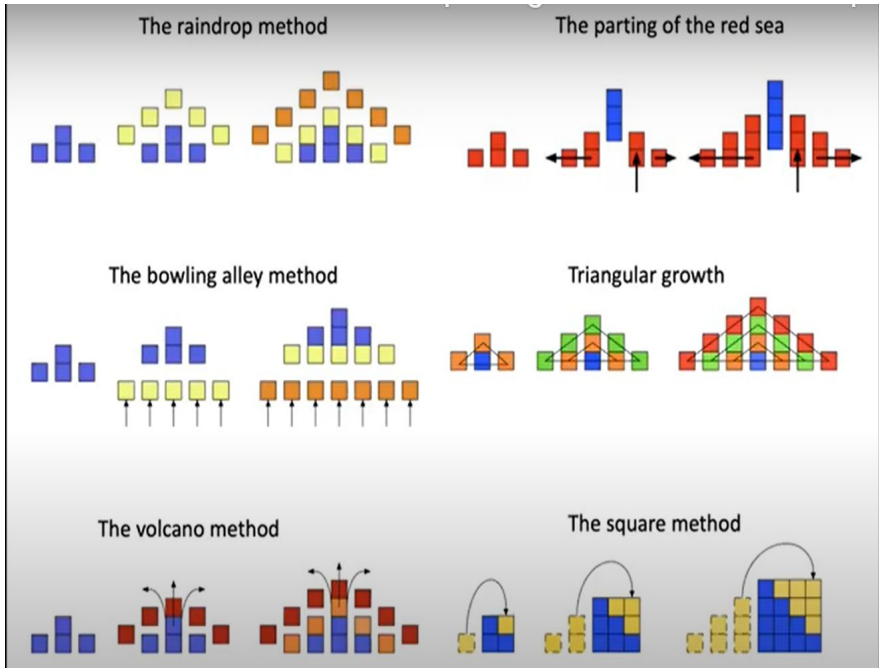

Children must hold
math in their hands
Before they can hold
math in their heads.

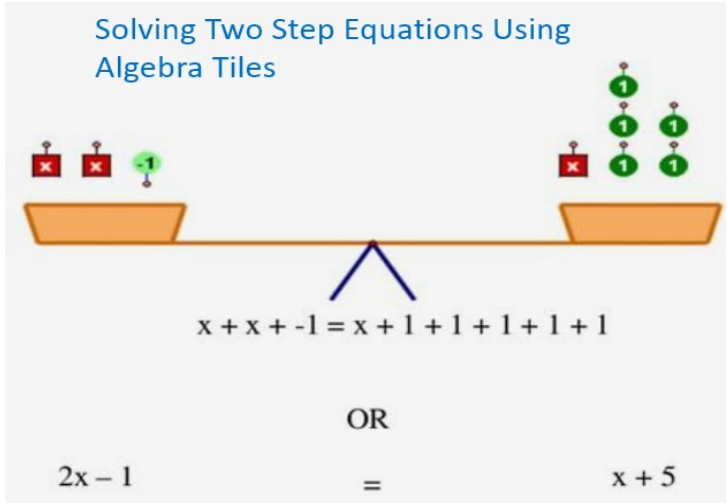

Missing numbers
What has been taken away?

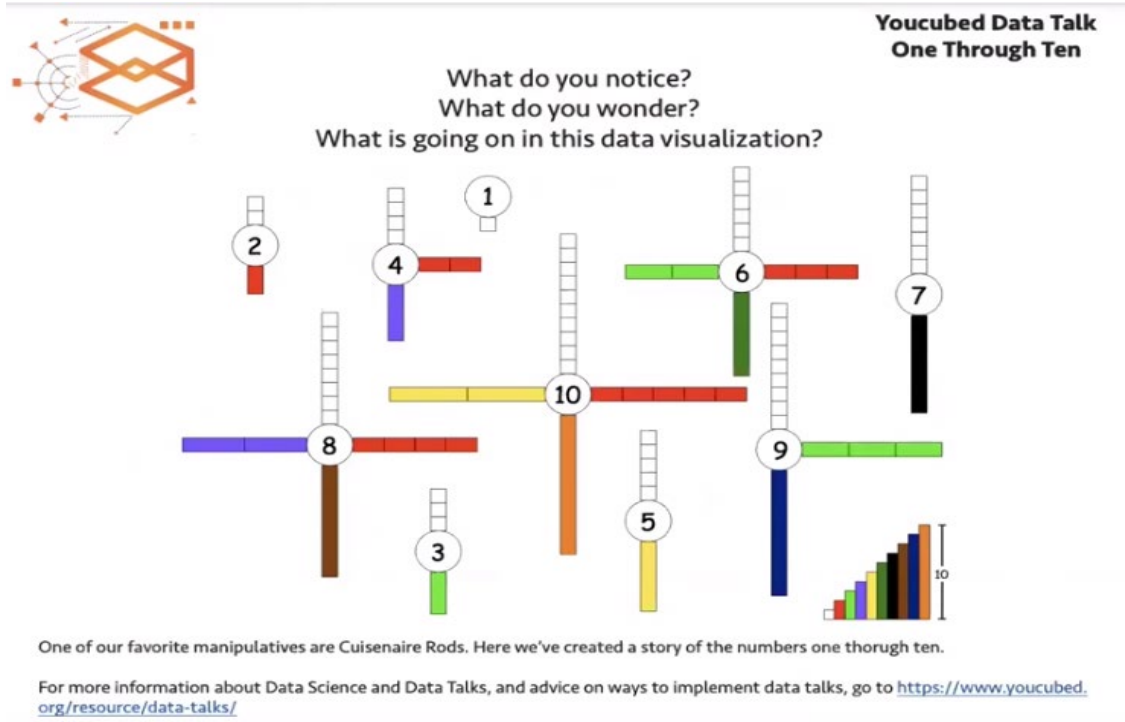



(x+1)(2x-1) =
2x²+x-1


Weapons of Math Destruction™
MOM, I CAN'T FINISH MY MATH HOMEWORK, WE ARE OUT OF GLUE.
Bob Botham
© Oak Norton


The raindrop method
The parting of the red sea
The bowling alley method
Triangular growth
The volcano method
The square method


Solving Two Step Equations Using Algebra Tiles
x + x + -1 = x + 1 + 1 + 1 + 1 + 1
OR
2x – 1
=
x + 5


Youcubed Data Talk
One Through Ten
What do you notice?
What do you wonder?
What is going on in this data visualization?
One of our favorite manipulatives are Cuisenaire Rods. Here we've created a story of the numbers one thorugh ten.
For more information about Data Science and Data Talks, and advice on ways to implement data talks, go to https://www.youcubed.org/resource/data-talks/

Method A:

423
− 195
300
− 90
230
− 5
228

> 230

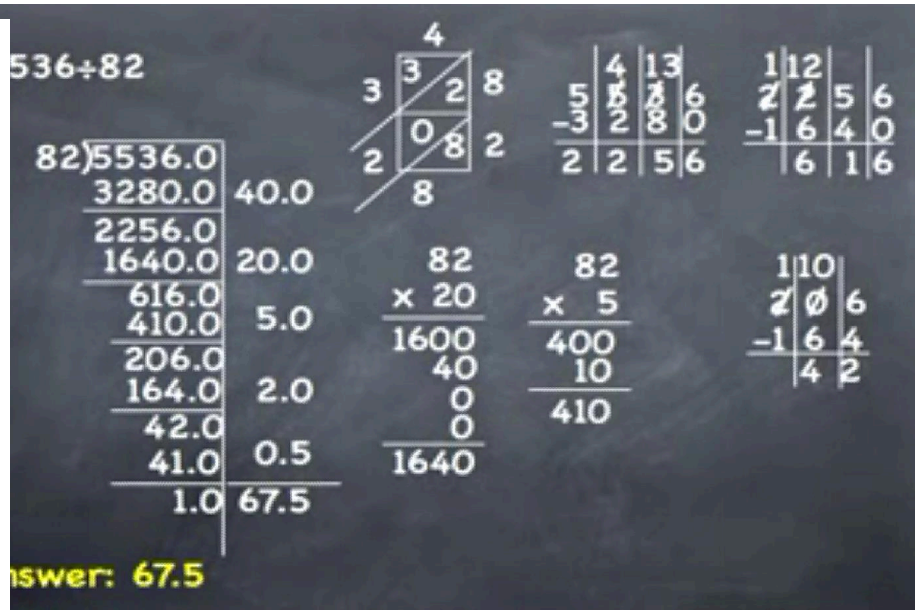
Method B:

423 − 195	423 − 100 = 323 323 − 90 = 233 233 − 5 = 228

4 | 1436

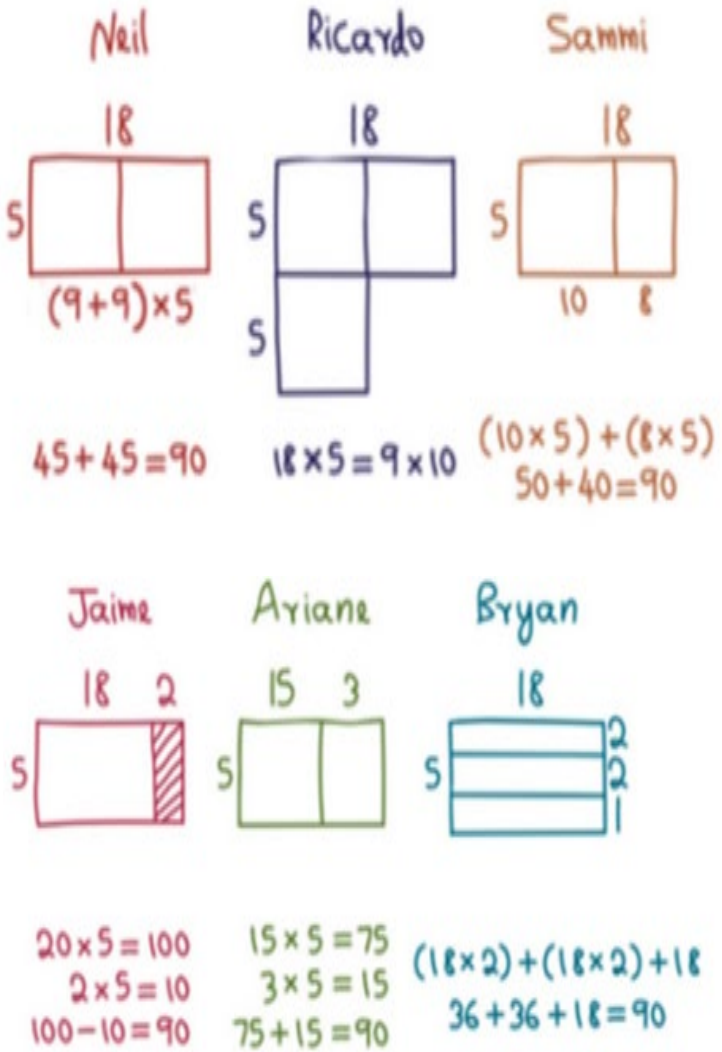
−1200	300	4 x 300 = 1200 1200 < 1436 ✓
236		
−200	50	4 x 50 = 200 200 < 236 ✓
36		
−36	+ 9	4 x 9 = 36
0	359	

1436 ÷ 4 = 359



Weapons of Math Destruction™

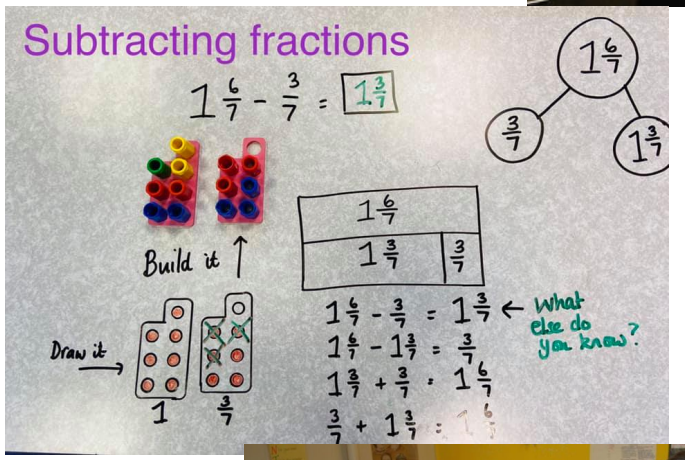
Work out 18 x 5 and show a visual solution



from Jo Boaler. Mathematical Mindsets (2016)

Stanley Ocken: Reform Math Causes Symbolic Shock in Future Students

- NCTM Standards-based curricula consistently claim to enhance students' **conceptual understanding**, a supposed advance over traditional adherence to blind rote manipulation. **This is nonsense.** When NCTM curricula use the term understanding, **they refer merely to the obvious and pedagogically useful technique of furnishing concrete models for simple arithmetical examples**, e.g. by using fraction strips to picture fractions such as ¾ and ⅔ . Every competent parent or educator knows that this is a good way to start. Unfortunately, a principal failing of curricula such as TERC is that **students never move beyond, and so are forced to rely on, simple models and representations**. As a result, when students confront purely symbolic representations that are not attached to physical models, they **simply freeze**. This reaction, perhaps best characterized as **symbol shock**, is, in my experience, a primary cause of students' failure to succeed in college mathematics.
https://math.jhu.edu/~wsw/ED/ocken



Post 17

Reform Math doesn't just fail kids — it **stupefies** them.

It sidelines essential skills and forces convoluted strategies that only work in special cases.

Textbooks are bloated with pictures, stories, and incoherent content.

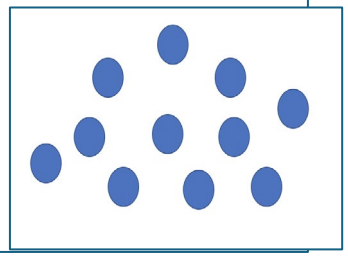
As mathematician W. Steve Wilson said, it prepares "future shoppers, not STEM majors."

Boasting "conceptual understanding," it delivers nothing but rote confusion and **a permanent mathematical handicap**.

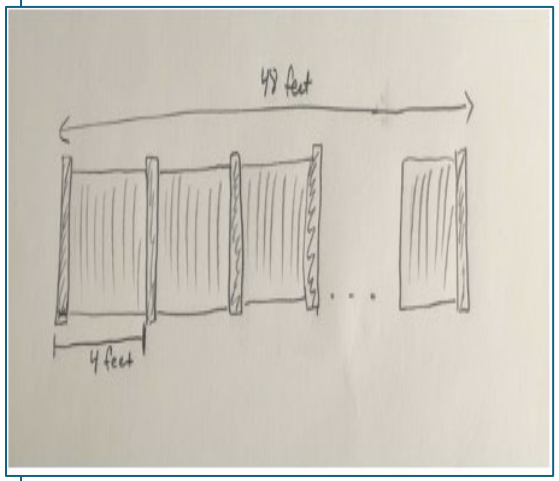
Reform Math Makes Easy Math Artificially Hard and Hard Math Impossible

CMF 2021 Sample Exercises:

Primary:
You have a collection of objects and your friend gives you 6 more. How many do you have and **how do you know**? **Explain your reasoning using words, pictures and numbers.**



Upper elementary:
You have a 48-foot-long fence made up of four-foot panels. How many four-foot panels are there? **How do you know?** Write a number sentence showing the calculation needed for this question. **Fully explain how your number sentence models this situation.**



High School:
F(x) = 3x+2 where the domain is over the interval [0,7]. Graph the function and include a table of values showing the integer ordered pairs. **Write a story** that might be modeled by this function. Explain how your story models the function.

Middle School:
A point is located at -17 on a number line. If you add 8 to -17 and move the point, where will it be located? Draw the number line showing the movement and write a number sentence that represents the movement of the point. What whole number is between? **Make a convincing argument proving how you know. Explain your reasoning fully.**

Reform Math Makes Easy Math Artificially Hard and Hard Math Impossible

- Turns simple math into lengthy essays and visual models
- Wastes time on trivial explanations instead of building real skills
- Burdens and bores early graders
- Promises “conceptual understanding” but delivers only rote understanding and mathematical handicap

Making Math Education Even Worse, by Marina Ratner

This requirement of visual models and creating stories is all over the Common Core. **The students were constantly told to draw models to answer trivial questions,** such as finding 20% of 80 or finding the time for a car to drive 10 miles if it drives 4 miles in 10 minutes, or finding the number of benches one can make from 48 feet of wood if each bench requires 6 feet.

Here are some more examples of the Common Core's **convoluted and meaningless manipulations of simple concepts**: "draw a series of tape diagrams to **represent (12 divided by 3) x 3=12,**
or: rewrite (30 divided by 5) = 6 as a subtraction expression."

This model-drawing mania went on in my grandson's class for the entire year, leaving no time to cover geometry and other important topics. While model drawing might occasionally be useful, mathematics is not about visual models and "real world" stories. It became clear to me that the Common Core's "deeper" and "more rigorous" standards mean replacing math with some kind of illustrative counting saturated with pictures, diagrams and elaborate word problems. Simple concepts are made artificially intricate and complex with the pretense of being deeper -- while the actual content taught was primitive.

Reform Math Doesn't Educate — It Stupefies

K-12: What Happened to Bill Gates and Common Core? By **Bruce Deitrick Price**
https://www.americanthinker.com/author/bruce_deitrick_price/

- Did Gates realize that Common Core, supposedly a new and higher instruction, incorporates all the dubious ideas from decades prior? **New Math and Reform Math were the basis for Common Core Math.** Similarly, **Whole Language and Balanced Literacy were rolled into Common Core's English Language Arts (jargon for *reading*).** Constructivism, which prevented teachers from teaching, has been undermining American schools for decades. Nothing new and higher about these clunkers.
- Did Bill Gates reflect empathically on the proposals in his billion-dollar baby? Everyone should try to imagine he's eight years old and has to struggle with Common Core every day. **The verbiage is convoluted and pompous; at every step, there are absurdly unnecessary steps.** Only one way to tie your shoes? Don't be silly. Every student needs to learn at least four or five! Finally, the kids are encumbered by a backpack full of bricks and not much else. One has to suspect that this mumbo-jumbo **was never intended to improve education, but to stupefy a generation.**
- There are hundreds of videos made to show how wonderful Common Core is. Instead, they show the opposite. Here's a single abominable video that can stand for all the others. The title is "Strategies for Addition and Subtraction." Notice the new layer added there. Instead of learning to add, children learn strategies for adding — five of them, no less. Everything will now remain in first gear as children struggle with *Regroup or Borrow*, *Decompose*, *Cross Number Puzzle*, *Use or Draw Base Ten Blocks*, and *Solve Using Money*. Think how many hours you can waste debating which strategy to use in each situation.

W. Steve Wilson: Reform Math Fosters Future Shoppers, Not STEM Majors

- States love to have kids figure out many ways to add, subtract, multiply, and divide, but often leave off the capstone standard of fluency with the standard algorithms (traditional step-by-step procedures for the addition, subtraction, multiplication, and division of whole numbers). For example, only seven states expect students to know explicitly the standard algorithm for whole number multiplication. Fractions are even harder to find done well. Standards for fractions are generally so vague that nearly everything is left to the reader. Often states expect students to develop their own strategies or a variety of strategies for dealing with fractions. For example, only 15 states mention common denominators.
- There will always be people who think that calculators work just fine and there is no need to teach much arithmetic, thus making career decisions for 4th graders that the students should make for themselves in college.
- Downplaying the development of pencil and paper number sense might work for future shoppers, but doesn't work for students headed for Science, Technology, Engineering, and Mathematics (STEM) fields.
- There will always be the standard algorithm deniers, the first line of defense for those who are anti-standard algorithms being just deny they exist. Some seem to believe it is easier to teach "high-level critical thinking" than it is to teach the standard algorithms with understanding. The standard algorithms for adding, subtracting, multiplying, and dividing whole numbers are the only rich, powerful, beautiful theorems you can teach elementary school kids, and to deny kids these theorems is to leave kids unprepared. Avoiding hard mathematics with young students does not prepare them for hard mathematics when they are older.

Post 18

This isn’t just an American problem.

Reform Math is **a global pandemic**.

France, Finland, Canada, New Zealand, Taiwan, South Africa and many others adopted it — and got the same disastrous results.

Britain’s former Schools Minister **Sir Nick Gibb** warns: “Progressive teaching destroyed our education system.” England reversed its decline by rejecting progressive ideology. https://www.telegraph.co.uk/news/2025/08/09/progressive-teaching-destroyed-education-system-labour/

The evidence is overwhelming.

Reform Math: A Global Catastrophe for Children

Mathematics Education System in **South Africa**, by Zingiswa Jojo

- Outcomes Based Education (OBE), mainly characterized by **cooperative group instruction**, has been the guiding philosophy of South Africa's math education. It made it difficult for teachers to identify struggling learners in mathematics understanding at all levels. Reform math has made South Africa one of the **worst** performers in international math assessments.

20 Years Wasted – Enough is Enough, by Audrey Tan

- In 2016, **New Zealand**'s Year 5 students were the worst at maths in the English-speaking world. In 2020, its Year 9 students recorded the worst-ever results in maths and science.
- Around $100M of taxpayers' money had been spent on **a revolutionary approach** -- with the philosophy to **prioritize conceptual understanding over procedural knowledge and skills** -- to teaching maths, and it didn't work. The experiment had **failed**.

- **Taiwan** imported Discovery Math in the mid-1990s, but was forced to abandon it about ten years later after public outrage over a sharp decline in students' math competency.
- **China** began incorporating constructivist elements into its textbooks in the early 2000s, leading to a clear deterioration in rigor, coherence, and focus.
- The list of victims continues to grow: **the U.S., Canada, the U.K., the Netherlands, Finland, New Zealand, Australia, Israel, Sweden, South Africa, China, Taiwan** — and many more.

Reform Math is dumbing down students around the world.

Sol Stern: Hirsch's Insights about France's Education Debacle

https://www.city-journal.org/article/curriculum-is-the-cure

In the late 1980s, France deliberately copied American progressive education:

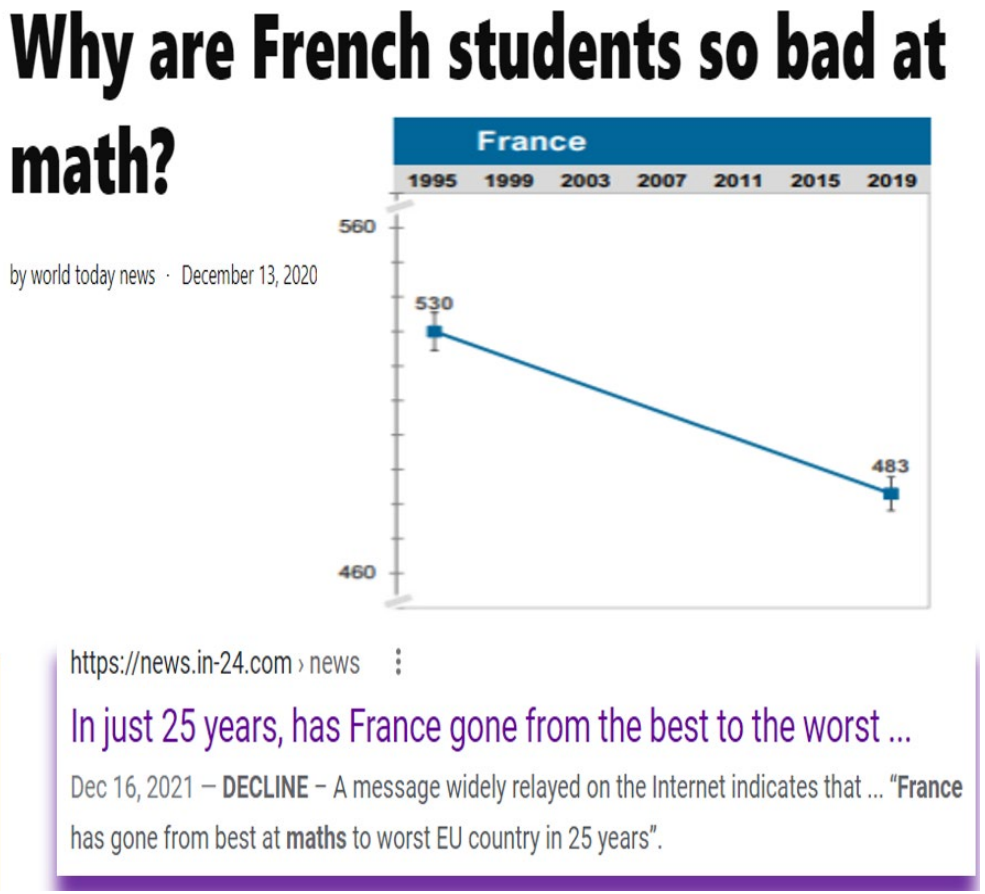
- Replaced its rigorous national curriculum with "child-centered" pedagogy
- Embraced "cultural diversity" and individualized instruction
- Scrapped universal academic standards for all students
- Shifted teacher training toward constructivism, discovery learning, and "relevant" activities

Within just 20 years:

- Math and reading scores plummeted
- The achievement gap widened dramatically
- France lost its long-held edge in international tests

E.D. Hirsch's verdict:

- "The results are decisive."
- Abandoning a knowledge-rich curriculum in favor of progressive ideology leads to rapid academic decline.



Discovery Math Caused Canada's Sharp Math Decline

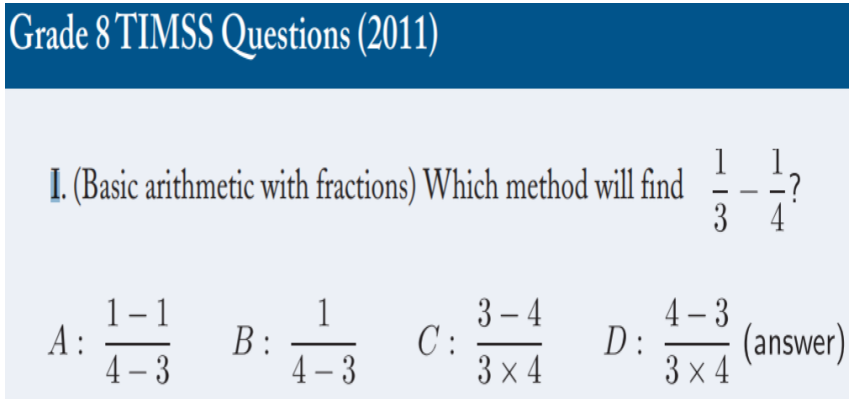
What to do about Canada's declining math scores, by Anna Stokke, 2015

Key Characteristics of Discovery-Based Learning:

- Minimal teacher guidance and explicit instruction
- Open-ended problems with multiple solutions
- Heavy use of manipulatives, drawings, and student-invented strategies
- Standard algorithms (e.g., long division) are discouraged
- Memorization of math facts is deprioritized
- Minimal worksheet practice or written symbolic work
- Problem-solving: a top-down approach in which students work on complex problems, **even though foundational skills might not be present**

The Results:

- Between 2003 and 2012, nearly every Canadian province saw statistically significant declines in PISA math scores.
- In a 2011 TIMSS Grade 8 question (1/3 − 1/4), over 70% of Canadian students failed — while Singapore scored 83% and Korea 86%.



Success Rate	
KOREA 86%	QUEBEC 33%
SINGAPORE 83%	ONTARIO 33%
TAIPEI 82%	ALBERTA 28%
HONG KONG 77%	WORLD 37%
	GUESSING 25%

Long-term Effects in Learning Math in Finland – Curriculum Changes and Calculators, by Olli Martio

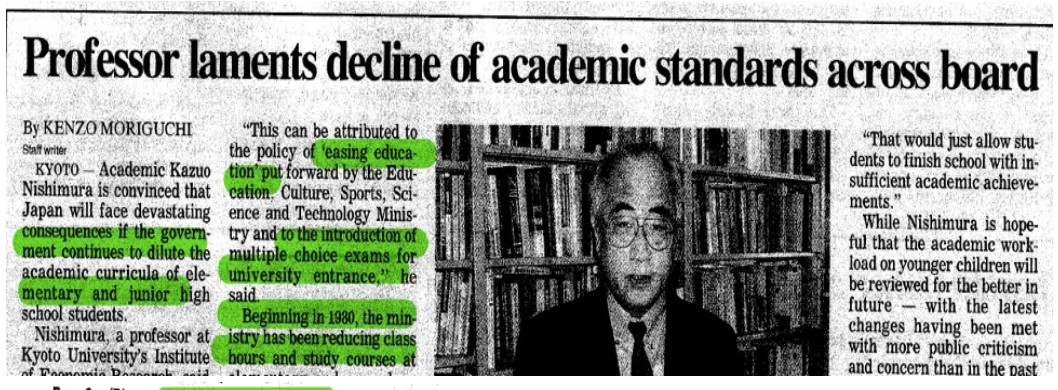
2. Mathematics curriculum—changes and effects

The changes in the mathematics curriculum in Finland have followed the international trends. Since 1970 three major revisions have taken place. The first was influenced by the so-called New Math. This created a lot of discussion but had a relatively small effect. The second revision can be labelled "Back to basics". The last change "Problem solving" had a much greater impact. It was very much influenced by the demand that the applications of mathematics are all important—mathematics as such has little value. The influence of calculators was also profound. It was thought unnecessary to teach those skills which can be performed by a calculator. Similar changes were experienced in other OECD countries.

Severe Shortcomings in Finnish Mathematics Skills

Taiwan: Constructivist Math Made Taiwan Students and Parents Pay a Heavy Price

Six years after the implementation of constructivist mathematics in the previous year (2002), the first group of students to receive the new teaching method has been promoted to the first year of junior high school. Because students' mathematical computational skills have dropped significantly and no other abilities seem to have been improved, the original experts of constructivist mathematics were criticized as **'harming the country and the people'** amidst the backlash from the public. Minister Huang Rongcun had no choice but to announce that the continuous nine-year curriculum would no longer emphasize 'constructivist mathematics' to calm parents' emotions. However, **this practice of treating the nearly 1.8 million elementary school students across the country as guinea pigs has already made students and parents pay a heavy price!**



Professor laments decline of academic standards across board

By KENZO MORIGUCHI
Staff writer

KYOTO — Academic Kazuo Nishimura is convinced that Japan will face devastating consequences if the government continues to dilute the academic curricula of elementary and junior high school students.

Nishimura, a professor at Kyoto University's Institute

"This can be attributed to the policy of 'easing education' put forward by the Education, Culture, Sports, Science and Technology Ministry and to the introduction of multiple choice exams for university entrance," he said.

Beginning in 1980, the ministry has been reducing class hours and study courses at

"That would just allow students to finish school with insufficient academic achievements."

While Nishimura is hopeful that the academic workload on younger children will be reviewed for the better in future — with the latest changes having been met with more public criticism and concern than in the past

Page 2 (D) Monday, November 2, 1998

General

University students failing in basic mathematics

1 out of 5 pupils unable to solve simple problems

Yomiuri Shimbun

One out of five students at private uni-

Sample questions

Q 1: 8×5+(4−1)×2)−5×(6−4÷2)=

Q 2: Determine the values of x and y in the following equations.
$3x+y=17$
$2x-5y=3$

Q 3: Determine the value for x in the following equation

pass rate of 86 percent.

The figure fell for questions at the middle school level, with the two universities registering success rates of 56 percent and 77 percent, respectively.

When tested on quadratic equations taught in the third year of middle school, only 13 percent of students at the former university and 28 percent at the latter

China's Reform Math: The New Curriculum's Lack of Coherence and Rigor Overburdens Teachers, Students, and Parents

What has the New Curriculum taken away from math classes?

By Boju Jiang, Professor at the Peking University, Fellow of the Chinese Academy of Sciences

- The "New Curriculum" completely denies the past teaching system, replacing every stage (three years per stage) with four major modules: Numbers and Algebra, Space and Graphics, Statistics and Probability, and Practicality and Integration. The knowledge taught is haphazard and disjointed. It underestimates students' comprehension abilities. If a student asks why, they have to wait for the next cycle of "spiral progression".

Post 19

For decades progressives called traditional math “elitist and racist.”

The truth is the opposite.

Reform Math is the real soft bigotry of low expectations.

Global crises prove it **dumbs down every race**.

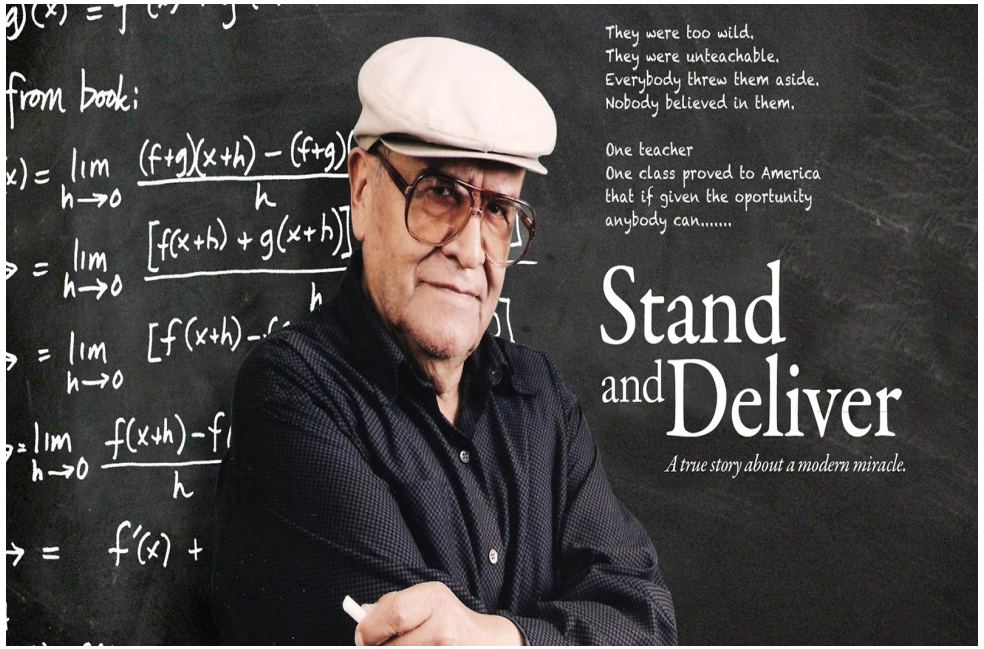
Disadvantaged students thrive with high standards — just look at Escalante, Xu, Yom, and Success Academy.

Reform Math is **cognitive child abuse**.

In the age of artificial intelligence, it is creating **artificial stupidity**.

Disadvantaged Students Can Excel in Advanced Math

Year	Taking (AB / BC)	Passing (AB / BC)	Total Passing	Key Notes
1978	5 / -	2 / -	2	Program start
1982	18 / -	18 / -	18	Stand and Deliver year (all passed after re-test)
1983	33 / -	30 / -	30	More than doubled
1984	55 / 13	51 / 12	63	Strong growth
1985	81 / 16	56 / 9	65	Continued expansion
1986	68 / 25	59 / 19	78	High pass rate
1987	108 / 21	73 / 12	85	Peak year: **Ranked 4th nationally in total AP Calculus exams**
1988	90 / 29	42 / 13	55	High volume
1989	118 / 22	68 / 7	75	Still strong
1990	85 / 24	64 / 13	77	Solid results
1991	106 / 37	62 / 25	87	Escalante's final year

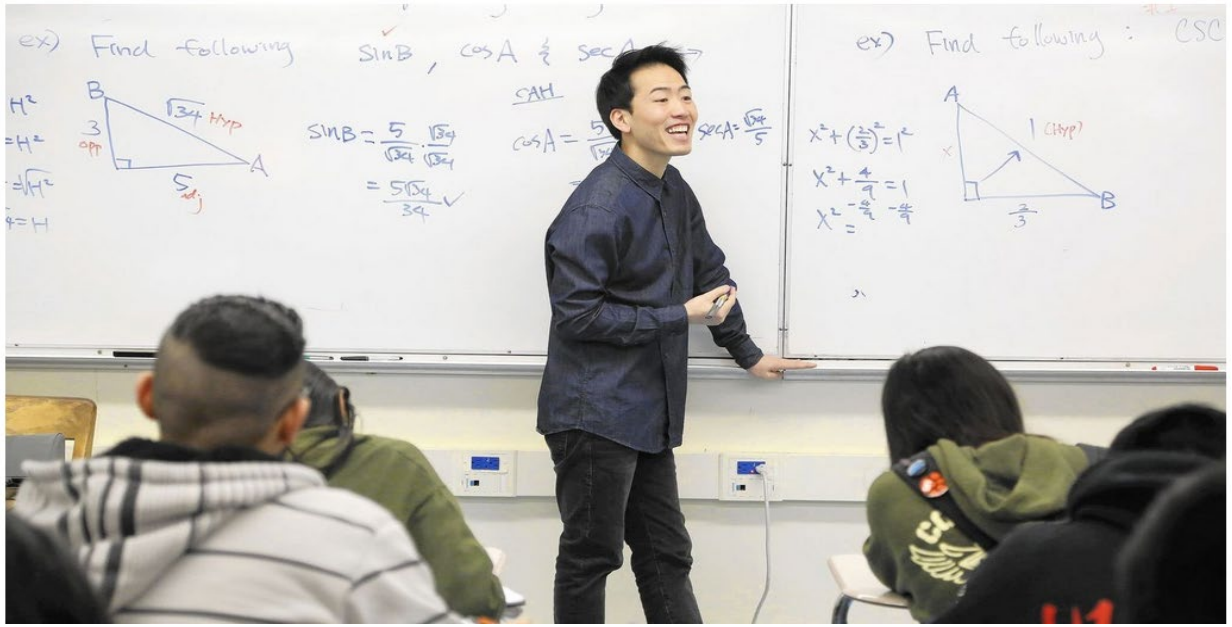


In the 1980s, Jaime Escalante at Garfield High (East LA) taught low-income Latino students — children of day laborers and seamstresses — to pass AP Calculus. Hundreds succeeded, and many thrived in college and careers.

Disadvantaged Students Can Excel in Advanced Math

How a Lincoln High teacher gets all his students to pass the AP Calculus exam

By STEVE LOPEZ FEB 03, 2016 | 1:30 AM



Abraham Lincoln High School senior Cedrick Argueta received a perfect score on the AP Calculus exam.

- In 2016, at Lincoln High School in East Los Angeles (~80% Latino, low-income), teacher Anthony Yom achieved a **100% pass rate** on the AP Calculus AB exam for **the 3rd year in a row**.
- Out of 302,532 students worldwide, all 21 of his students passed — and Cedrick Argueta (son of immigrants) scored a **perfect 5**, **one of only 12 students** in the world.

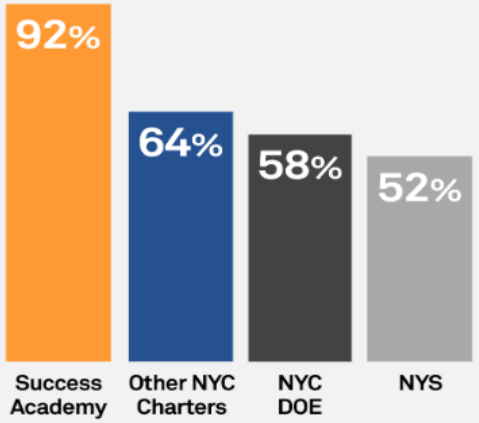
Disadvantaged Students Can Excel in Advanced Math

2025 NEW YORK STATE EXAM RESULTS

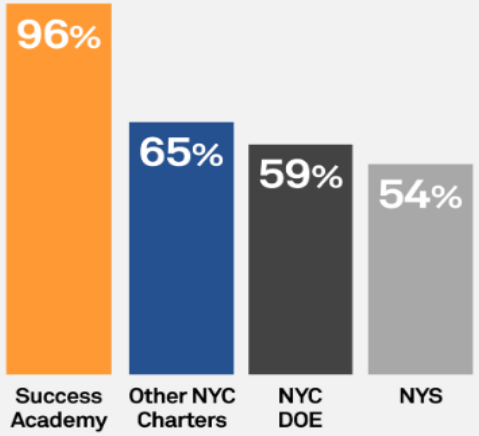
Leading the State in Performance

In 2025, Success Academy ranked #1 in Math and #2 in Reading/ELA out of more than 700+ K-12 school districts and charter networks in New York State.

ELA Passing Rate



Math Passing Rate



GPA: 3.90
College Bound:
Rochester Institute

Took 1+ AP exam compared to 35% of all US students

Passed 1+ AP exam compared to 22% of all US students

Composite SAT average, 2023 graduating class

Algebra 1 exam pass rate

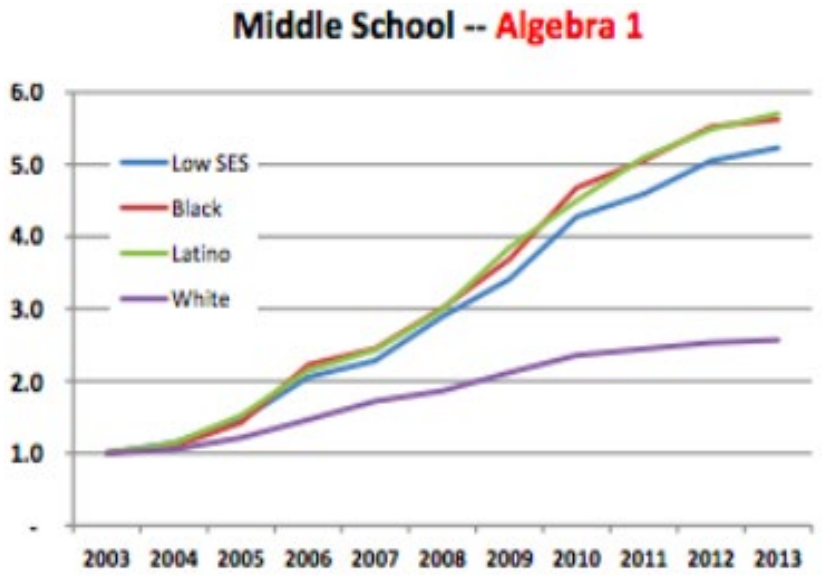
Disadvantaged Students Can Excel in Advanced Math

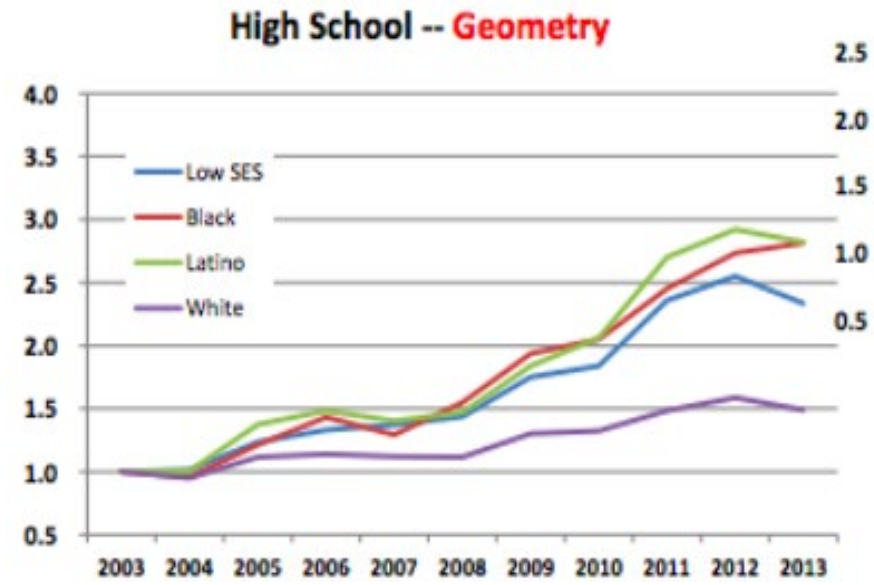
California's Common Core Mistake, by Williamson Evers, Ze'ev Wurman

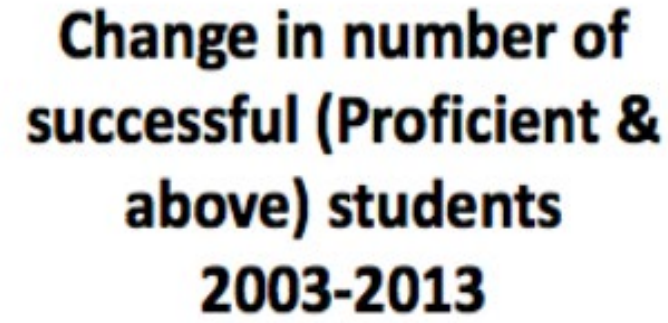
Between 2002 and 2013, California followed rigorous, internationally competitive math standards written by mathematicians.

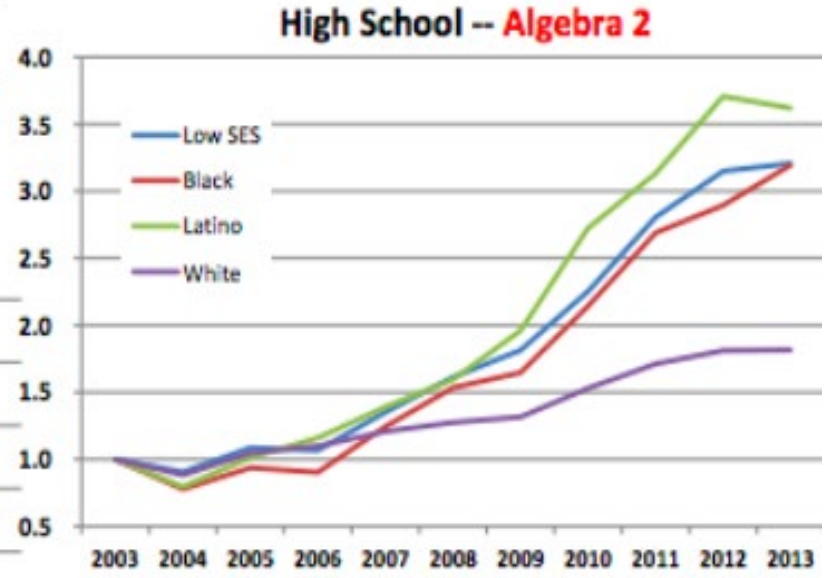
The results were striking:

- Successful Algebra II students doubled — from 47,000 to 97,000.
- Successful Geometry students nearly doubled — from 69,000 to 122,000.
- **Disadvantaged students improved at double the rate of white students.**









Post 20

Michael Xu, now 73, feels a growing urgency — and deep pain — over the continuing decline in math performance, especially among disadvantaged students who have suffered most from Reform Math.

In retirement, he mentors math teachers in Arizona and California. Since 2024, he's been actively mentoring at a low-income middle school in East Palo Alto, co-taught five weeks last year, and returns to teach summer school again this year.

"If any underperforming school would like to invite me, I'd be happy to come," he says. "The more challenging the situation and the greater the need, the more motivated I am to help these children succeed."

Contact via private message. Thank you for reading.

New chapters of Mr. Xu's teaching magic are being written by Yellow Heights:

- Chapter 1: The Road to Teaching
- Chapter 2: Teaching Math in America: Initial Challenges
- Chapter 3: Building the Foundation for Success
- Chapter 4: The IDK Method
- Chapter 5: Learning Language and Math
- Chapter 6: Playing with Math
- Chapter 7: What's Required of a Teacher
- Chapter 8： Some Harmful Practices in K-12 Math Education
- Chapter 9: A Comparison of Math Education in China and the U.S.

- **“In all my years of teaching, I have never encountered a student who failed to master basic arithmetic due to intellectual limitations.”**

- **“Elementary and middle school math should be accessible to all students. Even first-year university math is within the reach of most.”**

Michael Xu