

“A Revolution in Education”

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565 words a 2 minute read

“We haven’t thought very creatively about education...We are in the midst of a once in a century technological revolution, and the last time we did this, in the 20th century, hand-in-hand with the industrial revolution went a revolution in education. We haven’t had near the revolution in K-12 commensurate with the digital revolution we are in the midst of. So I don’t think we are thinking ambitiously enough or investing enough in the young...”

The Economist editor-in-chief Zanny Minton Beddoes 12.9.20

WHY IT MATTERS: When students ask, “Why do I have to learn this?”-- we must be able to answer -- “To prepare you for the world you *will* inherit by becoming a creative STEM problem solver, data analyzer, and spreadsheet fluent user.”

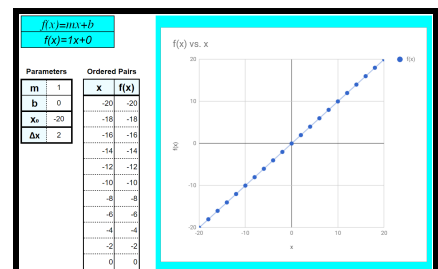
THE BOTTOM LINE: Eliminate Algebra 1 to make room for this “revolutionary” math that will engage students and promote equity, because:

- **Algebra 1 is irrelevant.** Spreadsheets do not use or solve equations, the focus of this premier course. “When did you last use the quadratic formula?”
- **Algebra 1 is obsolete.** Technology has made its paper-based exercises like “solve $3x-5=7$ ” useless. When you can “Search Google” to get the answer.
- **Algebra 1 is the “point of failure.”** It rigidly tracks and segregates students, prevents high school graduations, and destroys college dreams for so many.

THE BIG PICTURE: Algebra 2 covers the same concepts using functions and variables not equations and unknowns. Having both causes students to ask, “Why is **y** now **f(x)**?” “Why is **x** a variable not an unknown? What’s the difference?”

Algebra I	Algebra II
Equations	Functions
Solve Linear Equations	Introduction to Functions
Graph Linear Equations & Inequalities	Linear Functions
Solve Systems of Equations	Quadratic Functions
Factor & Solve Polynomial Equations	Polynomial Functions
Graph & Solve Rational Equations	Rational & Radical Functions
Graph & Solve Radical Equations	Exponential & Logarithmic Functions
Solve Quadratic Equations	Trigonometric Functions
x is an Unknown	x is a Variable

- **Functions are the foundation** of College Algebra, Precalculus, Statistics, Calculus and essential to data analysis, coding, and STEM problem-solving.
- **Spreadsheets make functions** concrete and visual. A variable is a column of numbers and a function is a rule transforming inputs into outputs.



- **Spreadsheets are laboratories** that enable students to interact, to ask “What if... not answer “What is__?” and learn math as a true STEM subject.
- **Spreadsheets give all students a fresh start.** A new way to learn math independent of past performance, elevators not ladders.

THE EVEN BIGGER PICTURE:

Math, as the science of patterns for solving real-world problems, has long been the math educator’s dream. But calculation friction, real-world data complexity, and abstract pedagogy have limited us to simplistic artificial exercises. Spreadsheets change that.

*The rapid growth of computing and applications has helped cross-fertilize the mathematical sciences, yielding an unprecedented abundance of new methods, theories, and models. No longer just the study of number and space, mathematical science has become **the science of patterns**...*
Lynn Steen, Science 1988.

- **Why master paper algorithms** for whole numbers, decimals, and particularly fractions when our students won’t ever use them?
- **Why learn the concepts in traditional order** (add→subtract→multiply→divide) when that order is based on algorithmic complexity not conceptual difficulty?
- **Why teach the Algebra 2, Precalculus, Calculus sequence** when spreadsheets or other apps make their algorithms/exercises obsolete, and functional thinking unifies their concepts/applications.

THE NEXT THING: Spreadsheets will revolutionize education like they did business. Once we accept that students no longer need to learn Algebra 1, the entire math curriculum collapses, and like reading, will lose its grade-to-grade sequence and focus on problem-solving.

- **What if Algebra Workshop**, Introduces function concepts on spreadsheets that prepare teachers and students for digital age problem-solving.
- **What if Math Explorations**, A prototype problem-solving library of creative “case studies” ranging across interests, enlivened by “proper” questions, and enriched by visualizations, Web-links, shared activities, datasets, and spreadsheet labs.
- **What if Math Labs**, 125 single-concept student spreadsheet lessons for learning key ideas and applying them using functional thinking and spreadsheets that treat math as an experimental science.

