

MAKER MATH

A Case Study on KID Museum's
Approach to Addressing Learning Loss



Math Scores in Crisis

The pandemic intensified learning gaps - and schools, teachers, and parents need more support.

KID Museum has deep experience in supporting teachers while boosting learning outcomes by providing distinct learning experiences that not only counteract learning loss but also actively engage students, fostering greater knowledge retention.

Maker Math is a proven case study in increasing learning outcomes. Through highly specialized teacher professional development and tailored learning experience, Maker Math transforms the educational experience, making it not only enjoyable but also significantly enhancing comprehension and retention. This program caters to diverse learning styles, ensuring that students not only recover lost knowledge but also cultivate a lasting passion for learning.



American students scored 13 points lower [in math] than in 2018, equivalent to losing two-thirds of a year of education in the subject. These were the lowest U.S. math scores recorded in the history of the PISA math test, which began in 2003.

-The Hechinger Report



Why Maker Math: Alignment with Maker Learning



KID Museum's strategies for addressing math concepts through maker learning:

- Address math standards through problem-solving applications, setting the stage for students to “figure out” the concepts needed to accomplish their goals
- Provide hands-on opportunities that help students make sense of math concepts that may be confusing or hard to grasp in the abstract
- Allow students time and space to build their understanding of math concepts organically and independently as they work towards individual design projects
- Present students with tasks with built-in feedback mechanisms, affording students opportunities to see the results of their assumptions and make adjustments to their work

Program Outcomes

KID Museum evaluated the Maker Math program using a qualitative focused pre-/post-survey implemented by MCPS.



Increased enjoyment of math: 100% of students surveyed reported maintaining or increasing their enjoyment of activities involving math.

Increased resilience: 82% of students reported maintaining or increasing their resilience when math seems hard.



Upward trend in math scores: Math scores pre and post Maker Math implementation increased by 9%

Maker Math: Program Design

Maker Math was piloted in the Summer of 2023 as a 3-week program with rising 7th grade students in two Title I schools, enrolled in summer school instruction to address their additional needs in math.

Program Goals

- Increase student engagement and ability in key mathematical concepts and skills
- Build students' confidence as learners, specifically in math
- Articulate the value of math as an important and applied life skill
- Increase creative problem solving and perseverance skills

Teacher Professional Development

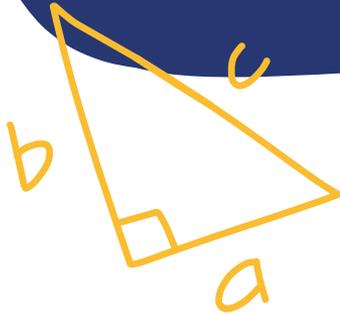
- The program engages school-based educators: teachers, Media Specialists, STERN Specialists. Teachers participate in 4 hours of professional development, with coaching from KID Maker Educators throughout the program
- The 14 lesson, 22.5 hour hands-on curriculum is delivered by classroom teachers, Media Specialists, or STEM specialists

I am so impressed with how much [my student] has changed during this program. Her attitude is completely different.

- Participating teacher



Maker Math is aligned to 6th and 7th grade Common Core Math Standards, and can be adapted for other grade levels.



Maker Math: Program Examples

Data, Probability, and Coding

Students use MakeCode for Microbit to design and program a game that they can play and share with their classmates. Students record win/loss data on a dot plot and determine the ratio of wins to losses. Students assess their data and use it to determine the win/loss rate that makes the best game. They then re-code their project and plot data from their new tests. They assess if their game was successful according to the "best game" criteria they set earlier in the lesson.

Ratios, Percentages, and Cardboard Carnivals | Maker Project: Cardboard Carnival

Students learn techniques for building with chipboard, including making hinges, joints and flanges. Then they utilize these and other skills in creating a scale model of their carnival game. Students collaborate with their team to plan a budget for materials for building their large scale game. In the following session, students acquire materials according to the budget plans. During purchasing, students will experience a "flash sale" in which they have to recalculate their budgets to account for set percentage decreases in price.

Maker Math: Program Examples

Exploring Angles with Robotics | Maker Project: Robotic Inventions

Students learn to build with and program various robotic components, including servo motors. Servo motors are programmed to move between locations based on angles (0-180). Based on their individual projects, students program their servo motors to move between two precise angle locations.

Measurements and Circuits | Maker Project: Circuit Boxes

Students design and build their own circuit boxes using various electronic components including switches, LEDs, motors, and buttons. After choosing the components and designing their boxes, students must determine to correct size hole for each component in their boxes. Students collect measurements for each component and use the information to choose the correct size tools (drill bits) for their individual projects.

The curriculum development devoted to this program including dedication to prototyping and reflection make it stellar for students!

- Participating teacher

$$2x + y = 0$$





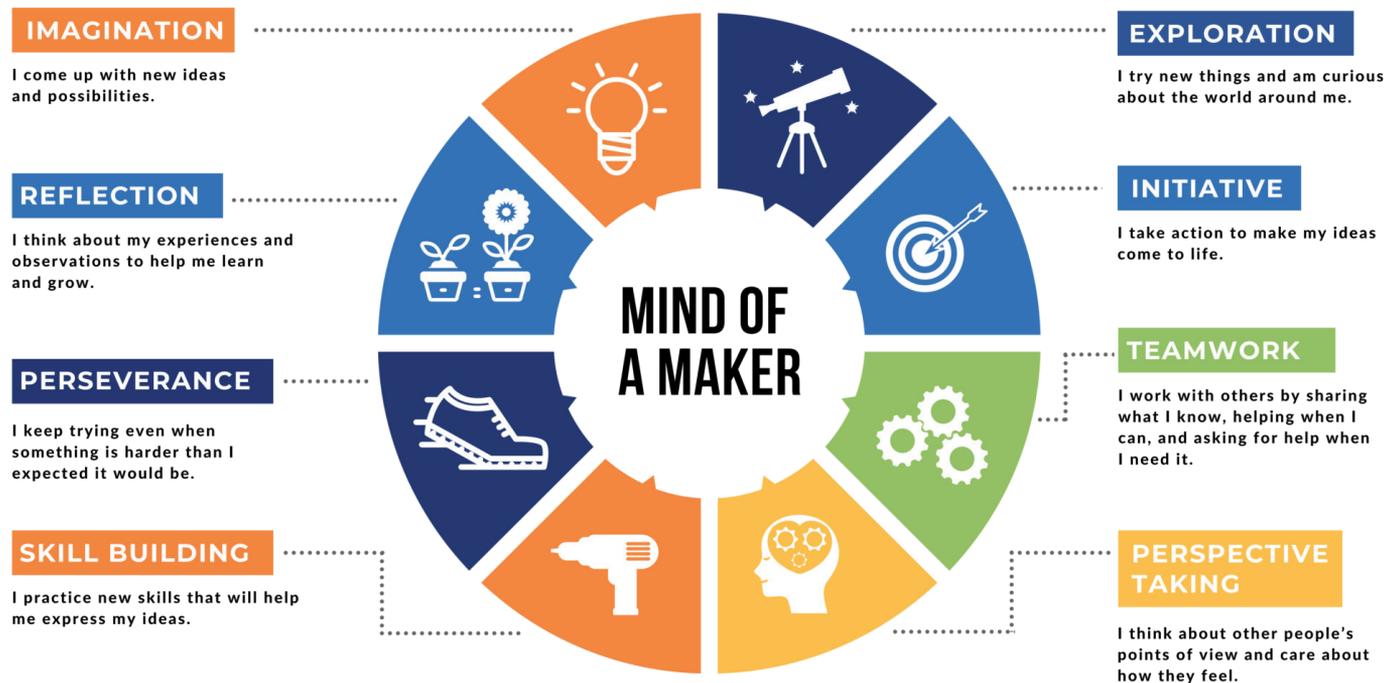
About KID Museum

KID Museum is the nation’s leading center for maker learning. We design and deliver programs directly to K-12 youth, educators, and families, with an intentional focus on equity and inclusion.

KID is revolutionizing STEM by providing a continuum of high-impact programs, working across in-school and out-of-school-time settings.

Our Learning Philosophy

KID’s hands-on, experiential learning programs unlock the **creativity, agency,** and **empathy** to support the next generation of innovators and changemakers. Our approach is grounded in “maker learning” — hands-on, project-based learning experiences that incorporate tech, engineering, and creative problem-solving skills.



Partnering with KID Museum is an investment in reshaping the future of education

We believe the solution will require partnership and collaboration across sectors. Through partnership, we can support the urgent need to improve education outcomes while efficiently deploying programming that we know moves the needle.

Join us in revolutionizing education and fostering a brighter future for students across America through KID Museum's mission.



Watch Now:
Invest in the Future
of Education with
KID Museum



This program has re-inspired me as a teacher. I've been able to incorporate more hands-on learning into the classroom.

– Participating Teacher

