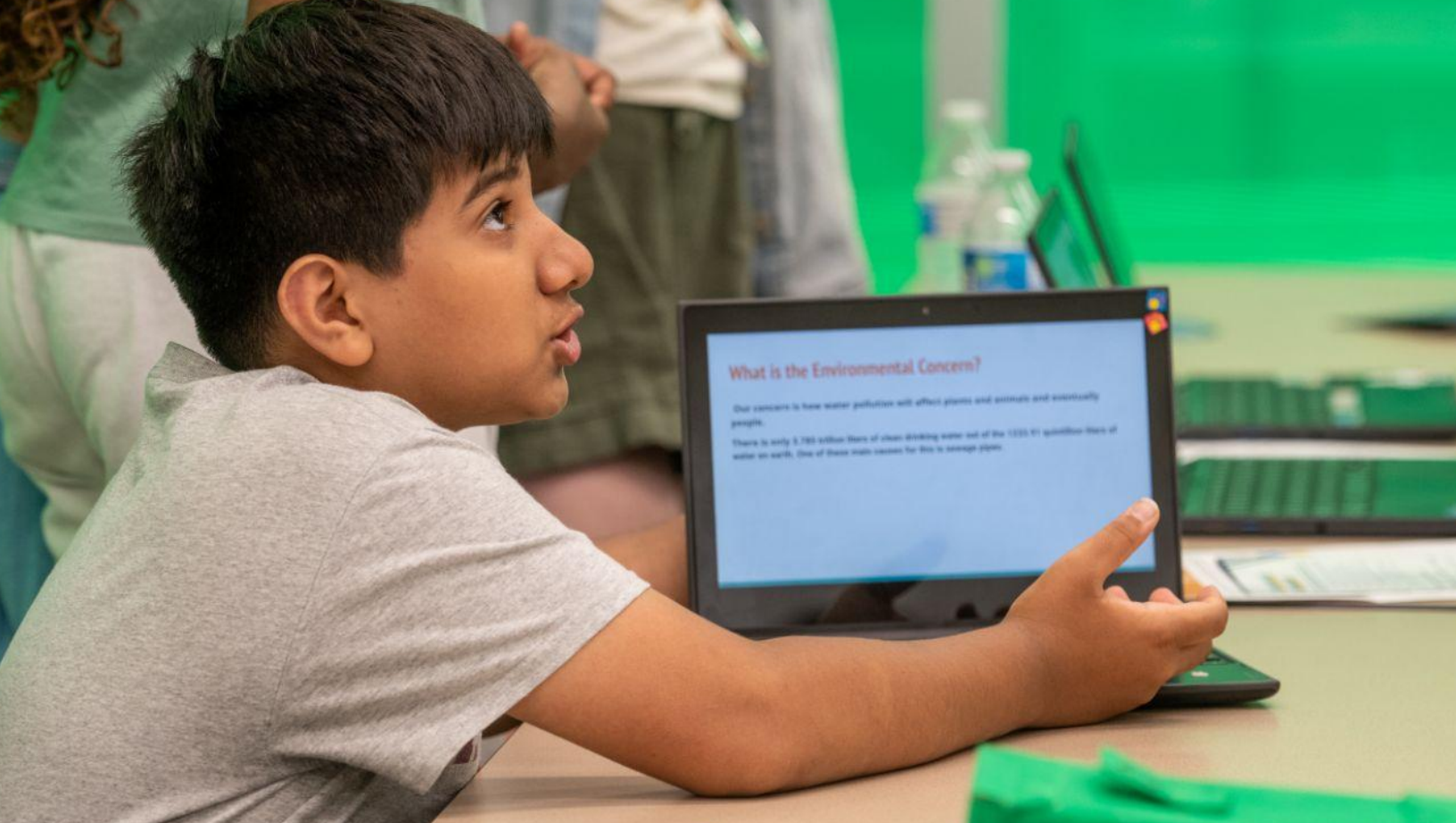






KID + MCPS Partnership:
Our Data & Impact
SY 2022-2023



 *“We have to start **STEM** exposure earlier, before middle school. And what they do at KID Museum has to exist in the classroom too.”*

*— Dr. Monifa McKnight, Superintendent, MCPS,
Community Conversation (May 2022)*

 *Students create unique projects using novel tools and materials that thoughtfully support literacy and math standards at their grade level. The curriculum development devoted to this program including dedication to prototyping and reflection make it stellar for students!*

— MCPS Teacher participating in KID Afterschool

Why Maker Learning?

KID Museum programs help students develop the “mind of maker” and build critical skills for the future. Students are activated as “makers” who build agency, confidence, and creative problem-solving abilities, while developing skills in design, engineering, coding, and 3D modeling.

Students become motivated learners with technical and social emotional skills, as they pursue self-directed projects based on their own interests. Our maker educators empower rather than instruct, while students actively engage with math and science concepts in order to invent.

KID Museum programs:

- Provide **dynamic, hands-on** learning experiences
- Leverage **STEM-rich**, maker learning experiences **aligned to NGSS**
- Encourage **exploration and iteration** through open-ended design challenges
- Promote **collaboration, interaction, and agency** in students

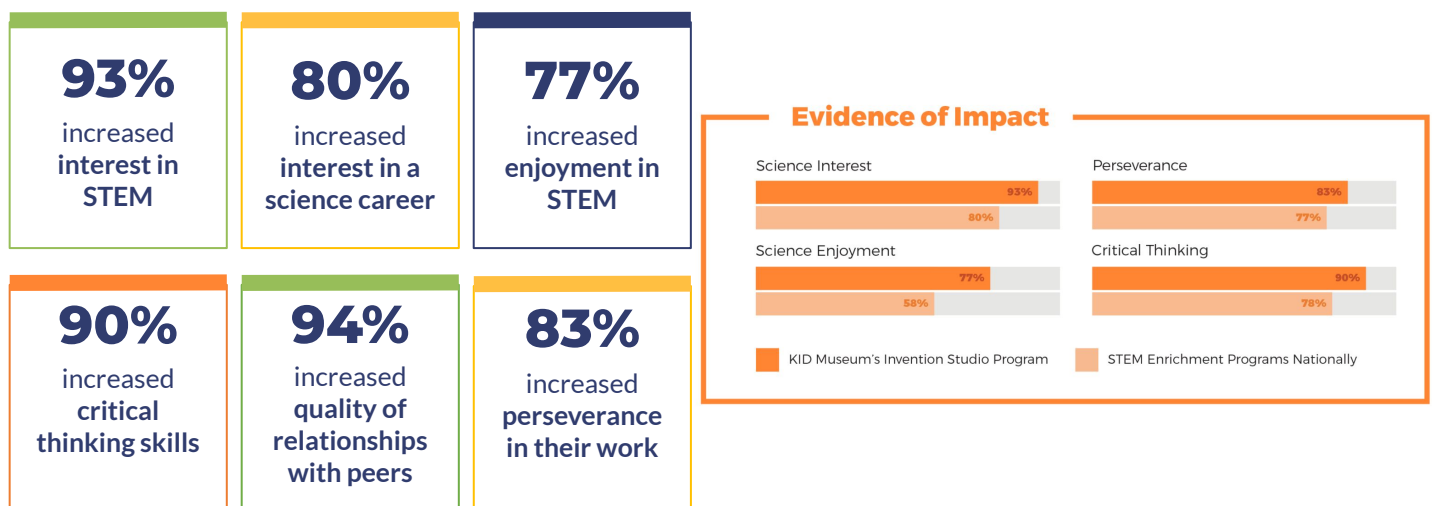


Our Shared History

In 2014, KID Museum's *Invention Studio* was piloted at Parkland Middle School. The goal of the program was to support students who were struggling academically and to narrow the achievement gap of the Latinx and African-American student population.

In 2016, the program was expanded to include 7 middle schools, and the impact on student outcomes increased dramatically, further validating the KID model.

Invention Studio Outcomes



Given the success of the KID model, in 2017, KID Museum partnered with MCPS to establish a districtwide, equity-focused STEM initiative at the middle school level. The ***Invent the Future*** program continues to broaden student access to hands-on, project-based learning experiences that promote technical problem-solving and social-emotional skills critical to succeed in a fast-changing, 21st century economy.

In collaboration with MCPS, we use a consistent set of criteria to identify schools for participation, prioritizing:

- High FARMs Rate Schools
- Teacher & Administrator Champions
- Geographic Diversity



Our Shared Vision

Since 2014, KID Museum and MCPS have partnered to leverage **maker learning** as an equity-focused strategy to **accelerate STEM skill-building** and **social-emotional learning**. Our goal is to create a continuum of K-12 maker learning experiences for all MCPS students, prioritizing underrepresented populations.

KID Museum's unique approach to learning centers on **creative problem-solving** and supporting youth to develop **agency and confidence as learners**.

KID Museum is a trusted **innovation partner**, providing:

- Deep learning experiences for students with a focus on equity and inclusion
- Curriculum development & teacher PD
- A platform for family & community engagement
- A bridge to industry and career exposure
- A model for other communities nationally



Evaluation of Impact

Across all of our programs, we gather sociodemographic data
(provided by the MCPS Office of Shared Accountability)

- **School**
- **Class/Club**
- **Gender**
- **Race/Ethnicity**
- **Services Received** (FARMS, EML, Special Education)

In addition to the meaningful data gathered in partnership with the [MCPS Office of Shared Accountability](#), KID Museum collaborates with two independent evaluation groups, [The PEAR Institute](#) and [Sharp Insight, LLC](#), to measure the impact of these programs. The tools leverage student self-reporting, retrospective change analysis, and teacher impressions of student outcomes.

Outcome Measures

In **students**, we are measuring:

- **STEM Attitudes:** Curiosity, Engagement, Career Interest, Identity, Perseverance, and Enjoyment in STEM
- **Social Emotional Skills:** Self regulation, Empathy, Relationships with Peers & Adults, Resilience, Reflection
- **Learning & School Engagement:** Learning Interest, Critical Thinking, Motivation
- **Acquisition of Literacy, Math, and Engineering Skills** aligned with key academic standards

In **educators**, we are measuring:

- **Educators' Confidence and Identity in STEM:** Confidence, interest, and ability to lead STEM activities



Our SY22-23 MCPS Programs

6,637

STUDENTS

346

TEACHERS

65

SCHOOLS

7,900

FAMILY MEMBERS

The majority of students experience 25+ hours of maker learning

- Over 3,000 students served during the school day, taking 4 field trips to KID Museum in addition to in-class curriculum and instruction
- 6 MCPS middle schools are implementing a semester-long course



Invention Programs

At present, KID Museum's Invention Programs are offered at both the **elementary and middle school** level, creating a **powerful learning continuum**.

Our programs **integrate STEM, design, and social responsibility**, along with **social-emotional learning**. They engage students in a sequenced maker-based curriculum including 4 hands-on field trips to KID Museum, in-class curriculum delivered by teachers (between 6 - 60 hours, depending on the program), teacher professional development, and community showcases.

Across multiple hands-on sessions, students are guided through the invention process — **designing, developing, prototyping, and troubleshooting their ideas**. As students build inventions to solve community and environmental problems, they build skills in **literacy, engineering, electronics, 3D modeling, computational thinking, and coding**. Additionally, throughout this process, **students learn how to innovate, solve problems, gain confidence, develop a deeper sense of empathy, and collaborate with others** — skills important for their future success.

KID Museum collaborates with **two independent evaluation groups**, The [PEAR Institute](#) and [Sharp Insight, LLC](#), to measure the impact of these programs. These **evaluation tools leverage student self-reporting, retrospective change analysis, and teacher impressions of student outcomes**.

ELEMENTARY

- KID Inventors
- KID Afterschool
- Summer ELO

MIDDLE

- Invent the Future
- *Intro to Inventing*
Summer Course

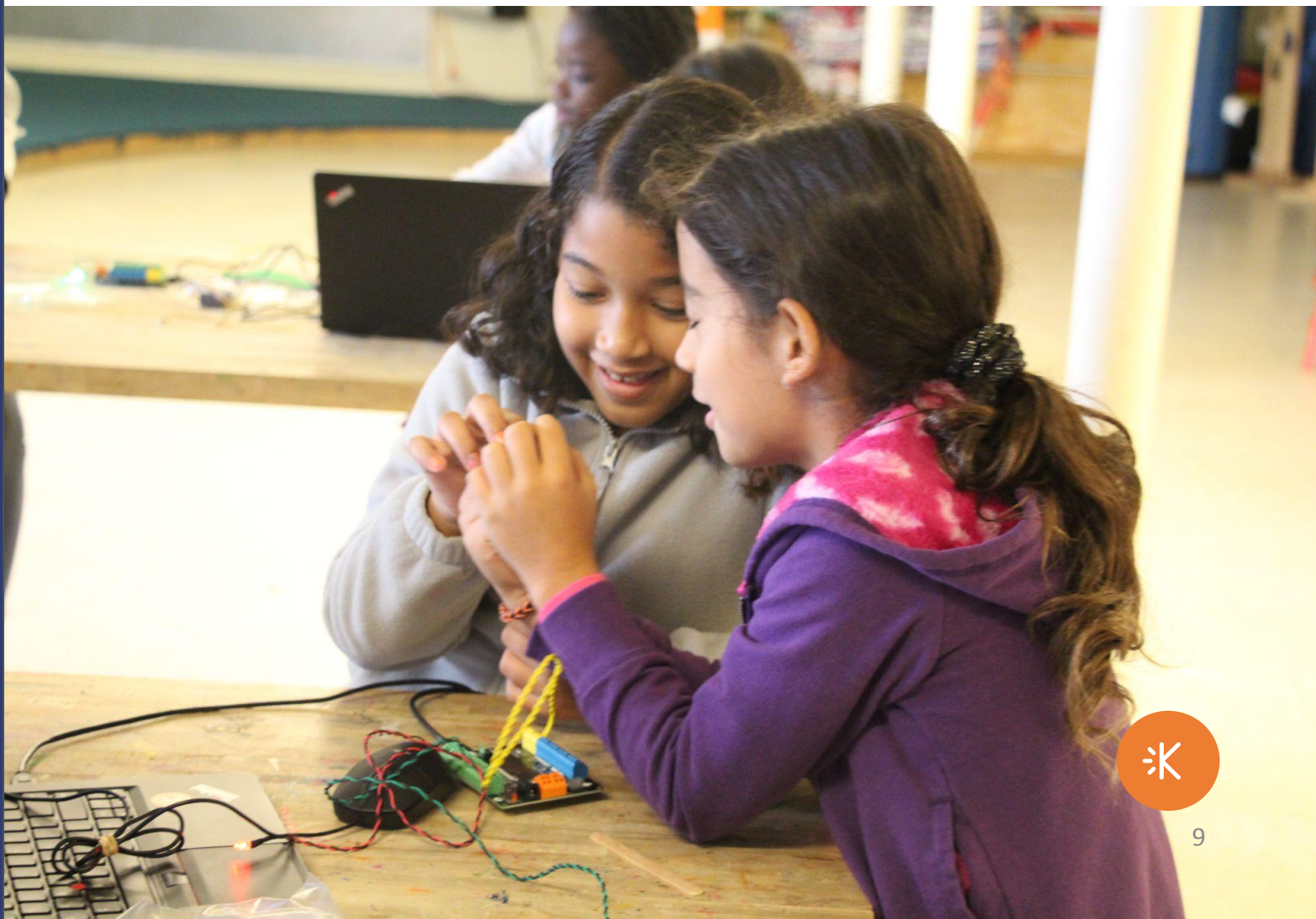


KID Inventors

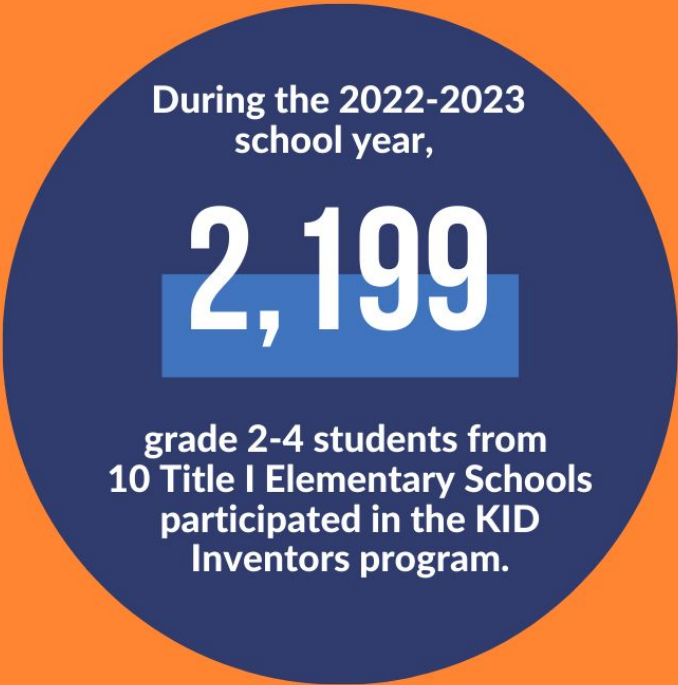
KID Inventors is a **comprehensive, multi-visit student program for Grades 2-4, including field trips to KID Museum, in-class curriculum, and teacher professional development support.**

This program is **aligned with** both **Next Generation Science Standards** (NGSS) **and key Common Core State Standards** (CCSS) in math, and can be integrated into a science class, STEM elective, or enrichment setting for elementary students.

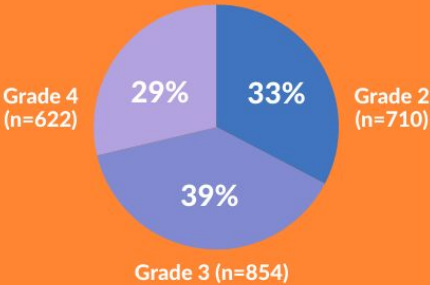
KID Museum's unique model leverages maker learning, which integrates STEM and project-based learning with creative problem-solving and social-emotional learning. Students build **skills** related to **scientific inquiry, computational thinking, engineering design, coding, and technology.** Most importantly, they **develop agency and confidence as learners.**



KID INVENTORS PROGRAM 2022-2023 IMPACT



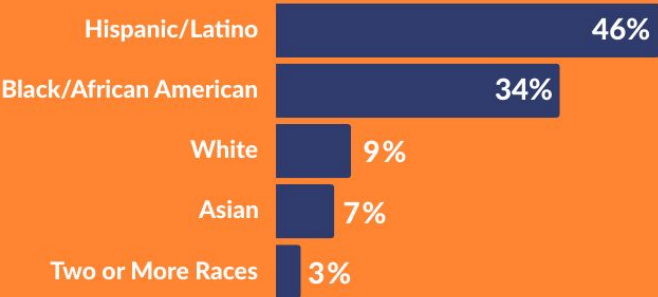
GRADE LEVEL



GENDER



RACE/ETHNICITY



SERVICES RECEIVED



Based on data from Data Brief "2022-2023 Data Summary of Select KID Museum Programs at Montgomery County Public Schools" from the Montgomery County Public Schools Office of Shared Responsibility, Applied Research and Evaluation



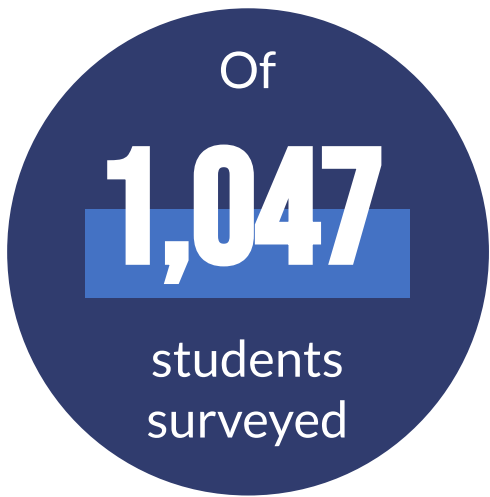
Program Measures

In 2022-2023, KID Museum evaluated the *KID Inventors* program with qualitative feedback surveys. KID staff designed tailored, age-specific, survey measures, delivered to students at the end of the program, to measure:

- The novelty of the STEM experience to the student
- The ability of the student to successfully generate solutions to a problem in the context of the program
- Student persistence within the program
- Student inventiveness within the program
- Student joy in learning STEM concepts within the program
- Student interest in STEM disciplines (science, engineering, and math)
- Student STEM/maker identity



Program Outcomes



95% experienced joy in learning STEM concepts	89% felt a sense of belonging at KID	86% thought “people like me” can be scientists or engineers
93% demonstrated perseverance at KID	92% were inventive during their experience	86% felt that KID helped to make their ideas come to life
84% liked science more because of KID	89% liked building and inventing more because of KID	71% liked math more because of KID

“I love that I can work with my friends, come up with different ideas, and talk about science.”

— MCPS 3rd grade KID Inventors student



KID Afterschool

KID Afterschool is a high-impact, extended learning program **aligned with key academic standards and social-emotional learning goals**. Originally funded by the Children's Opportunity Fund, and designed to support recovery from Covid learning loss, the program serves MCPS elementary students in grades K-3, providing opportunities for deep engagement with students and their families.

KID Afterschool employs a **teacher professional development** model. MCPS educators are provided with the **curriculum and training** to confidently deliver meaningful STEM education afterschool through making.

Students develop **math, literacy, critical thinking, and social emotional skills** during hands-on maker experiences, and through these experiences, become more interested and engaged in math, reading, and STEM inside and outside of the classroom.



KID AFTERSCHOOL PROGRAM 2022-2023 IMPACT

During the 2022-2023
school year,

229

Grade K-3 students from 10
MCPS elementary schools
participated in the KID
Afterschool program

Each student received
at least

24

Hours of hands-on
learning in KID
Afterschool

48

Hours of curriculum were
delivered over the full
school year

Program Measures

In 2022-2023, KID Museum evaluated the *KID Afterschool* program using a evaluation plan developed by KID Museum and Sharp Insight, LLC. Evaluation methods and data sources used for *KID Afterschool* evaluation included a combination of: student attendance logs, program monitoring forms, program observations at each site, interviews with staff, and teacher surveys. The program evaluation questions focused on:

- Youth engagement in STEM
- Youth attainment of program outcomes (e.g. social and emotional learning, STEM interest, engagement, and skill building)
- Youth attainment of mind of a maker skills (perseverance, initiative, imagination, reflection, and perspective taking)
- Youth centering of voice and identity
- Alignment with high-quality program standards
- Staff recruitment, training, and capacity
- Implementation of the program model as designed



Program Outcomes



100%

felt their students improved their **perseverance, initiative, and imagination**

86%

felt their students improved their **reflection and perspective-taking**

... because of KID Afterschool



100%

felt the *KID Afterschool* program strengthened students' STEM skills

100%

Felt the *KID Afterschool* program increased students' interest in STEM careers

100%

Felt the *KID Afterschool* program centered student voice and identities

100%

Of educators in the SY22-23 *KID Afterschool* program **hope to teach the *KID Afterschool* program in the 23-24 school year.**



Program Outcomes



Cultivate Mind of Maker practices for students

Encourage student exploration and iteration

Foster student agency

Allow students to express their creativity through self-directed projects

Teach the technical skills and STEM concepts in KID Museum lessons

Use culturally responsive sustaining education (CRSE) methods

... because of *KID Afterschool*



There were a couple of 2nd grade girls who struggled to engage and interact due to fear of failure. By the end of the program, each were more engaging within our setting and risked success more frequently. One of the parents commented that their daughter looked forward to KID Museum every week and couldn't stop talking out their adventures each week.

- Educator survey response



Invent the Future

Our longest running MCPS partnership, *Invent the Future* is a **maker-learning experience open to all MCPS middle school students**, challenging them to answer the question, **“What will you make to improve life on this planet?”**

Through the process of designing their own inventions in either a semester long in-school course, class, or afterschool club, students learn to **innovate, solve problems, gain confidence, engender compassion, and work with others** — all skills for future success.

The *Invent the Future* Challenge supports development of **innovative thinking, technical and social emotional skills, and an interest in STEM** — inspiring and supporting educators along the way with curriculum and skill building workshops.

The Challenge culminates with a Summit, where students are able to showcase their innovations, gaining valuable experience and confidence in their presentation skills.



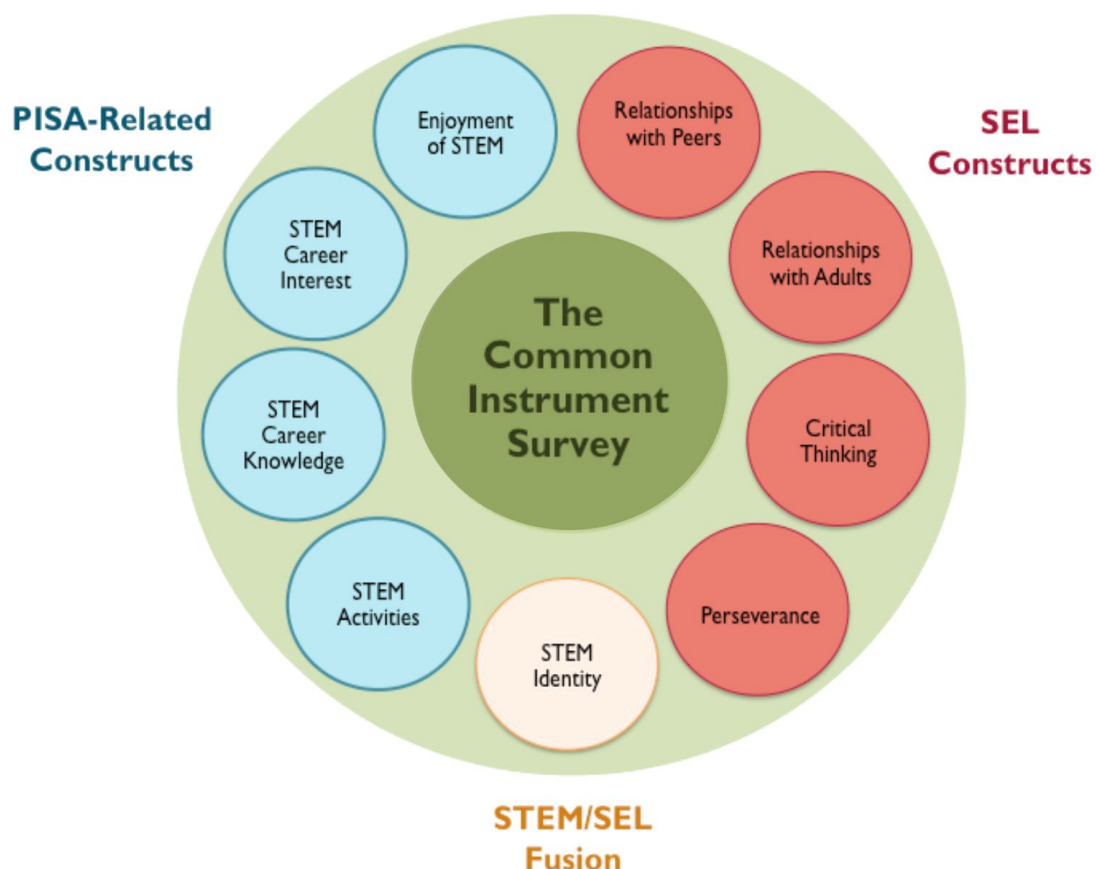
“I feel like every student should have this opportunity. We didn’t expect it to have such a huge impact on our lives!”

— Racheal, 7th Grader,
Invent the Future
participant

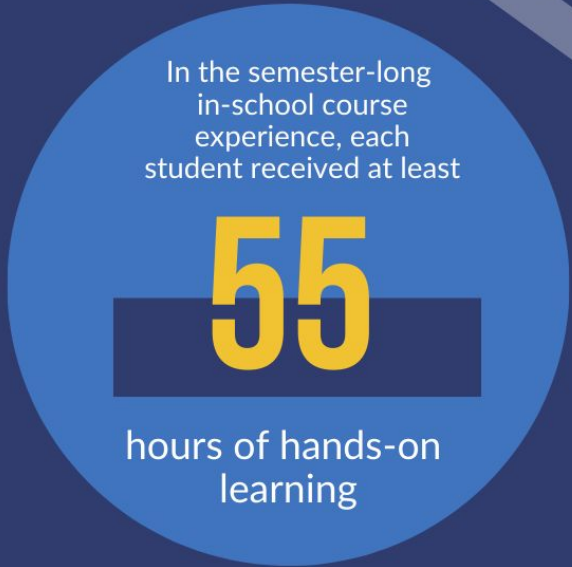
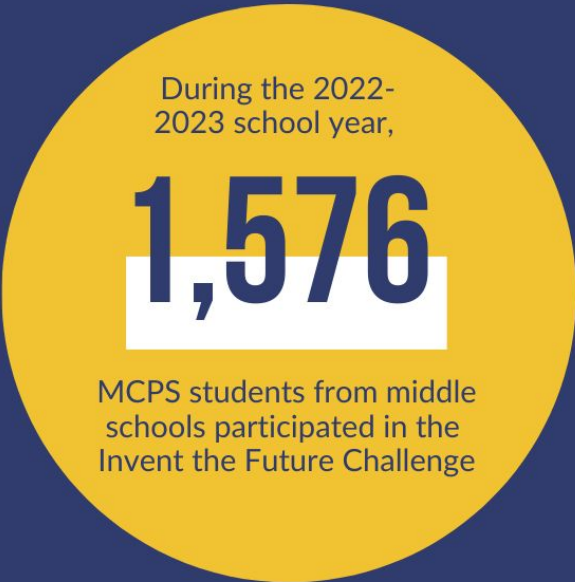
Program Measures

In collaboration with the Partnerships in Education And Resilience (PEAR) Institute at Harvard Medical School & McLean Hospital, KID Museum carefully chose particular scales on their Common Instrument Suite (CIS) survey to measure a range of outcomes:

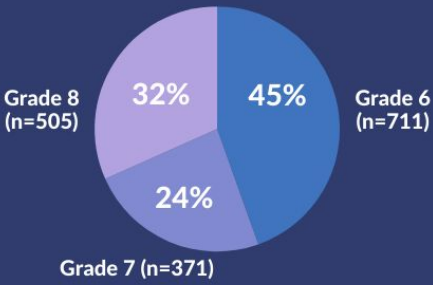
- Student interest and engagement towards STEM after participating in Invent the Future
- Student enjoyment of science, science career interest, science career knowledge, and engagement with science activities outside of school
- Student social-emotional learning /21st century (e.g. critical thinking, perseverance, relationships with adults, relationships with peers)
- Student STEM identity (recognition) and how able they feel they can do science (capability)
- Educator perceptions about their own STEM identities.
- Educator confidence and capability in leading STEM activities
- Educator perception of student STEM confidence, STEM skills and social-emotional skills.



INVENT THE FUTURE 2022-2023 IMPACT



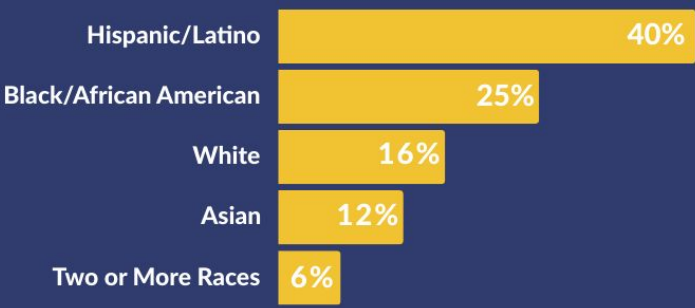
GRADE LEVEL



GENDER



RACE/ETHNICITY

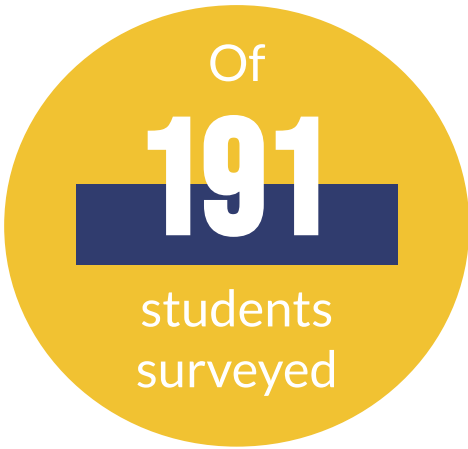


SERVICES RECEIVED



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Student Outcomes



PEAR Institute
Holistic Student Assessment

92%
extended or
increased their
critical thinking

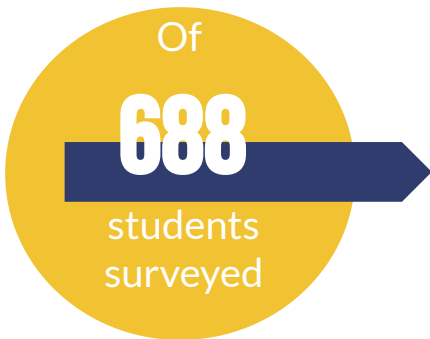
89%
extended or
increased their
**academic
motivation**

89%
extended or
increased their
learning interest

92%
extended or
increased their
reflection skills

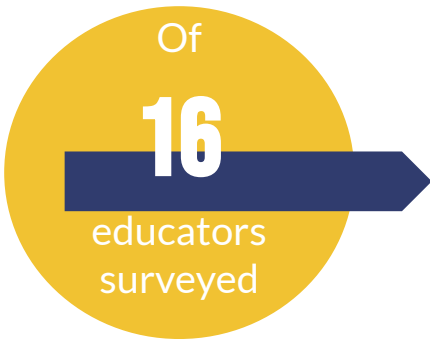
83%
extended or
increased their
assertiveness

85%
extended or
increased their
empathy



62%
of students reported
maintaining or increasing
their interest in having a
STEM job in the future

50%
of students reported being
**more curious about the
fields of engineering or
technology**



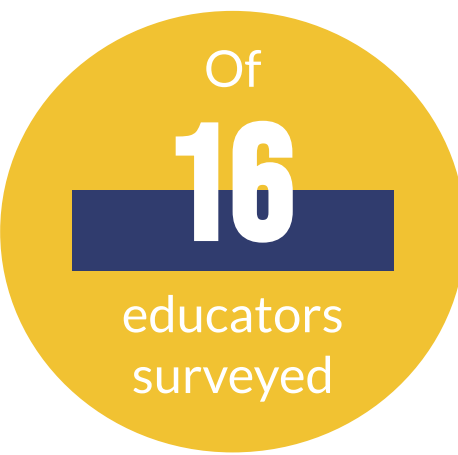
100%
reported that students
maintained or increased
their confidence in doing
**STEM and computer
science**

100%
reported that students
maintained or increased
their skills in doing
**STEM and computer
science**

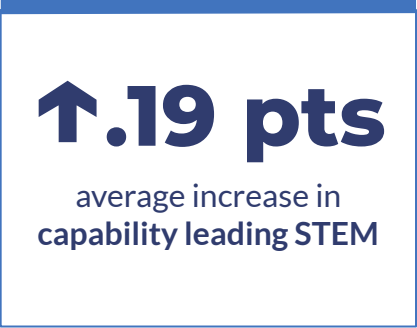
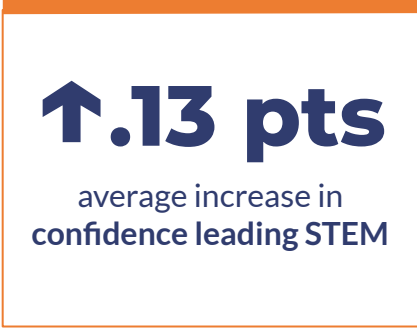
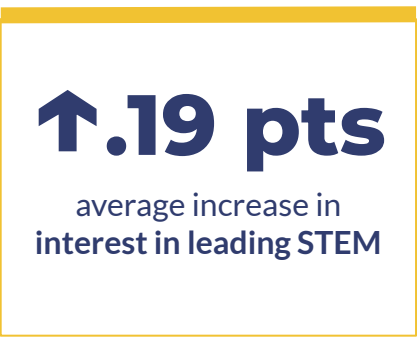
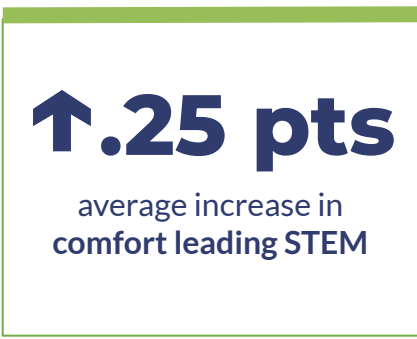
PEAR Institute
Common Instrument Suite



Teacher Outcomes



On a scale from 1 (Strongly Disagree) to 4 (Strongly Agree):



Summer Extended Learning

Make It Classroom (Elementary School level) and ***Intro to Inventing!*** (Middle School level) are **five week in-person summer programs** developed by KID Museum and designed to introduce students to STEM and 21st century skills by activating them as “makers,” who build agency, confidence, and creative problem-solving, while developing skills in engineering and design. Each five week program serves as a cohesive introduction to what it means to be a “maker,” emphasizing the fundamental mindset, skills, and strategies used in making.

Make It Classroom is a total of 25 lessons per grade level, each approximately 50-60 minutes in length. The curriculum is aligned to key math and science standards and NGSS Science and Engineering practices, with particular emphasis on omitted or condensed content in the 2019-2020 school year. Each lesson in *Intro to Inventing!* is approximately 50 minutes in length, and the curriculum is aligned to key AASL and NGSS standards.

In addition to student learning, in both programs, teachers also had Professional Development with KID Museum.



SUMMER EXTENDED LEARNING 2022-2023 IMPACT

During Summer 2022,

2,751

MCPS Elementary

&

100

MCPS Middle

School students
engaged in KID
Summer ELO
programs

Each student
received at least

25

hours of hands-on learning
in the **KID Summer ELO**
Programs



Program Measures

The goals of the programs are to:

- Activate students as “makers” and **build sustained engagement through dynamic STEM, maker-based learning**
- Provide opportunity for **students to engage in key AASL and NGSS standards through problem solving, critical thinking skills, and invention**
- Create space for **joyful exploration in summer learning**.

Teachers also received **KID Museum-led instruction and peer support** around the strategies, lessons plans, and tools provided to cultivate their students’ engagement and interest in STEM and making. KID Museum used educator surveys to evaluate the **implementation and relevance** of Summer ELO professional development to refine programming and set the stage for future outcome-based evaluation.

Program Outcomes



93%

agreed afterwards that
maker-based learning
increases their students’
problem-solving skills

97%

agreed afterwards that
maker-based learning
increases their students’
creativity

95%

reported learning
strategies to **actively**
engage their students

85%

reported planning to
implement new ideas and
teaching methods



Maker Math

Maker Math **combines the joy of inventing, social-emotional learning, and focused development** of major work math standards and the standards for mathematical practice. This three week program engages students in hands-on invention and maker learning, where students explore new ideas, **build skills in electronics, 3D modeling, and engineering design** while pursuing math concepts needed to build prototypes and inventions.

Students work together to design and build and playtest their own carnival game as they collaboratively **develop their math and engineering skills, interests, and confidence.**

The students in **Maker Math** were all rising MCPS 7th graders enrolled in summer school instruction to address their additional needs in math.



MAKER MATH SUMMER 2023 IMPACT

During the 3-week
summer course

19

7th grade students from MCPS
got hands-on experience
engineering and building
projects using math.

Each student received

22.5

Hours of hands-on
learning in Maker Math

One teacher told us:

“ ”

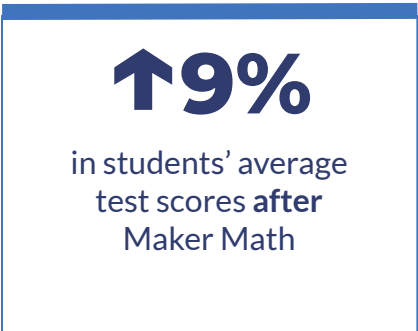
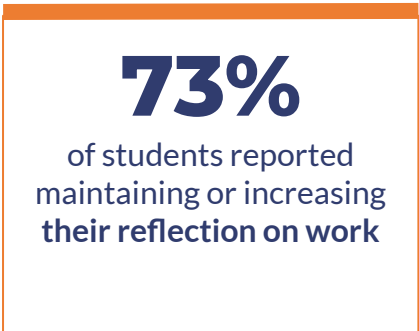
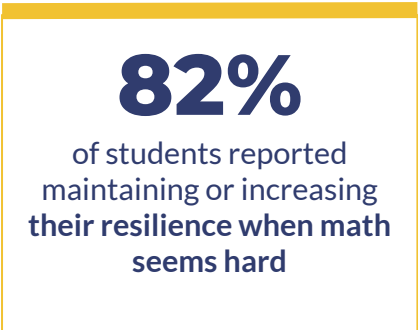
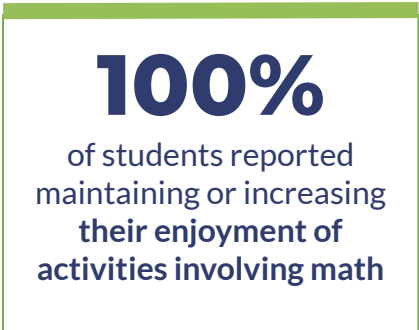
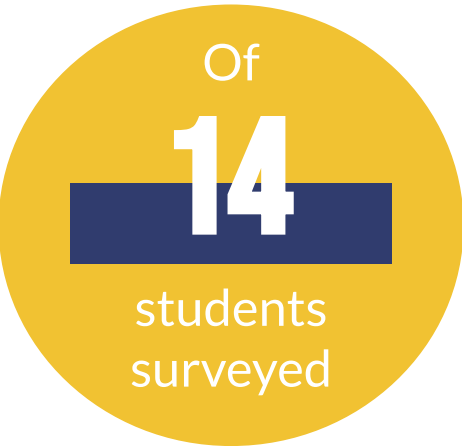
*I have kids who loved this
program and are asking to
enroll in my Invent the
Future class in the fall.*

Program Measures

In summer 2023, KID Museum evaluated the *Maker Math* program using a pre-/post-survey implemented by MCPS. In addition to comparing scores from a math test before and after the program, students responded to a series of questions about their Math Identity, confidence, and abilities.

- “I think of myself as a Math person.”
- “I think creatively and try different ways to solve problems.”
- “My friends think of me as a Math person.”
- “I am able to enjoy activities that involve math.”
- “If I do not understand what we are talking about during math activities, I will ask questions for clarification.”
- “I use math concepts in my everyday life.”
- “I often think, ‘I cannot do this’ when a math task seems hard.”
- “I reflect on my work so that I can make changes.”

Program Outcomes



Teacher Professional Development

KID Museum's **Maker Studio Program** was designed to **build school-wide capacity to support year-round maker learning driven by champion teachers in a school.** The program is geared towards individuals with school wide roles such as library media specialists and STEM teachers. The program includes 8 hours of professional learning workshops and up to 10 hours of in-class support from KID Museum Maker Educators.

Grounded in KID Museum's "Mind of a Maker" framework, the program includes **access to 10-15 skill building lessons and lesson starters, as well as maker materials to jumpstart activities.** Additionally, teachers participate in **full cohort workshops that integrate the introduction of maker skills, tools and materials with facilitation strategies** for maker learning and KID Museum Mind of a Maker framework. Each teacher also receives **individualized support in planning and progressing towards their goals.** Teachers participating in the Maker Studio program also leave with a **customized action plan based on their school community's unique characteristics, goals, and needs.** Participants addressed goals such as:

- Integrating a long-term maker learning project into existing curricular content at one or more grade levels
- Activating a media center makerspace with maker activities
- Building buy-in from the school community to support maker learning

In 2022, Maker Studio was delivered to **12 elementary schools** in MCPS, with **24 teachers** delivering high-impact, maker-based learning curriculum to more than 500 students. Ten of the schools have Title 1 status and/or high FARMS rates. Participants included classroom teachers and art, library, and media specialists.

Program Measures

KID Museum, evaluated the program with quantitative and qualitative feedback surveys. KID Museum designed brief feedback forms, including Likert-scales and open-ended questions, which were delivered to participants following the professional development workshop.



Program Outcomes



95%

of teachers felt the training was very effective at improving their engineering and construction skills

80%

of teachers felt the training was very effective at improving their agency in the maker classroom

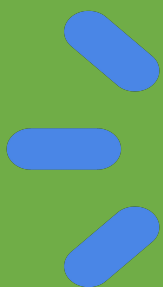
90%

of teachers felt the training was effective at improving their ability to make space for making in the classroom

70%

of teachers felt the training was very effective at improving their project planning skills

Overall, teachers felt more confident, comfortable, and competent to lead maker-based activities with their students.



“Amazing opportunity to bridge the concepts through a whole brain learning approach.”

— Participating Teacher in KID Museum’s Maker Studio PD



Family and Community Engagement

Across all of our programs, we create opportunities for additional family and community engagement.

KID Inventors: Each participating school hosts a family/school community showcase where students can demonstrate their invention creation process.

Invent the Future: Two ***Invent the Future*** summits and celebrations were held on **January 21** and **June 3** at the Universities at Shady Grove (USG). Community members, corporate/industry mentors, families and stakeholders were invited to engage with student teams and celebrate award winners. The *Invent the Future* program was featured in the [Washington Post](#) and [Fox 5 DC](#).

KID Afterschool: A custom-designed Spanish/English website offers families opportunities to extend maker and STEM learning using everyday materials in home-based family activities and projects.

MCPS Family Days: KID Museum hosted free family days for all MCPS schools on Sundays for a day of maker learning to deepen engagement and sense of belonging. These successful days welcomed **7,900 MCPS students and family members** into KID Museum's 3 Bethesda Metro Flagship location.



Our Strategic Priorities

Continuum of Learning Establish a continuum of maker learning experiences for K-12 students that support sustained engagement and impact.

Teacher PD Develop and support a cohort of teacher champions who serve as active partners in delivering maker learning experiences at scale in MCPS.

Access Prioritize access for students from high-poverty schools, with a mix of experiences embedded in the school day and in out-of-school time experiences.

Family Engagement Integrate family engagement experiences that complement in-school and out-of-school-time programs and deepen sense of identity and belonging.

College/Career Connections Incorporate contextualized exposure to college and career pathways across programs.

Evaluation Collaborate to demonstrate impact on student outcomes and teacher capacity.



Special Thanks

KID Museum extends gratitude to all the individuals who contribute to the success of the MCPS partnership. The district leaders, principals, and educators are passionate about reimagining STEM education for their students, and it is a privilege to collaborate. **Thank you!**

MCPS Leadership

Dr. Monifa McKnight

Superintendent

Dr. Patrick Murphy

Deputy Superintendent

Ms. Niki Hazel

Associate Superintendent, Office of Curriculum and Instructional Programs

Dr. Peggy Pugh

Chief Academic Officer

Ms. Irina LaGrange

Director, College and Career Readiness, and Districtwide Programs

Dr. Kecia Addison

Director, Office of Shared Accountability

Ms. Nichelle Owens

Director, Division of Title I and Early Childhood Programs and Services

Ms. Rebecca Dougherty

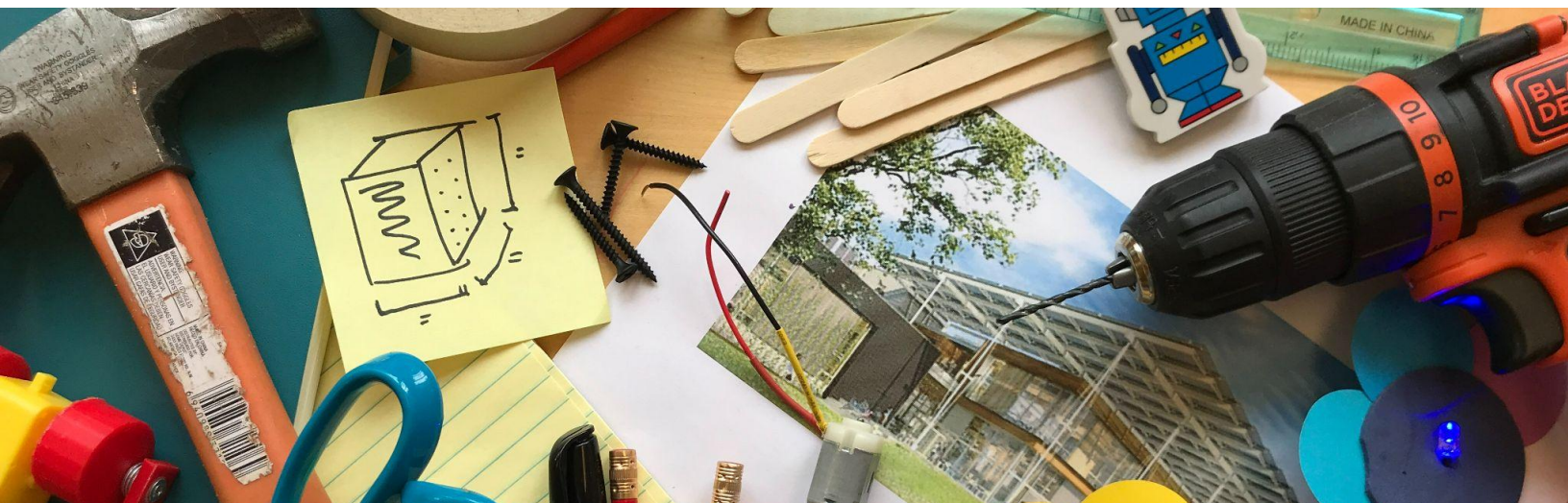
Supervisor, Division of Title I and Early Childhood Programs and Services

Mr. Shawn Krasa

Supervisor, Department of College and Career Readiness and Districtwide Programs

Ms. Andrea Christman

Supervisor, School Library Media Programs



Elementary Schools:

Bayard Rustin Elementary School
Bel Pre Elementary School
Brookhaven Elementary School
Brown Station Elementary School
Burnt Mills Elementary School
Capt. James Daly Elementary School
Dr. Charles Drew Elementary School
Clopper Mill Elementary School
Cresthaven Elementary School
East Silver Spring Elementary School
Fields Road Elementary School
Fairland Elementary School
Gaithersburg Elementary School
Galway Elementary School
Georgian Forest Elementary School
Glen Haven Elementary School
Great Seneca Creek Elementary School
Greencastle Elementary School
Harriet R. Tubman Elementary School
Harmony Hills Elementary School
Highland Elementary School
Jackson Road Elementary School

JoAnn Leleck Elementary School
Kemp Mill Elementary School
Lake Seneca Elementary School
Maryvale Elementary School
Meadow Hall Elementary School
Montgomery Knolls Elementary School
New Hampshire Estates Elementary School
Oak View Elementary School
Rolling Terrace Elementary School
Sally K. Ride Elementary School
Sargent Shriver Elementary School
Snowden Farm Elementary School
South Lake Elementary School
Stedwick Elementary School
Strathmore Elementary School
Strawberry Knoll Elementary School
Summit Hill Elementary School
Thurgood Marshall Elementary School
Twinbrook Elementary School
Viers Mill Elementary School
Washington Grove Elementary School
Watkins Mill Elementary School
Wheaton Woods Elementary School
Whetstone Elementary School

Middle Schools:

Argyle Middle School
Banneker Middle School
Briggs Chaney Middle School
Clemente Middle School
Eastern Middle School
Farquhar Middle School
Gaithersburg Middle School
Key Middle School
Montgomery Village Middle School
Neelsville Middle School

Odessa Shannon Middle School
Parkland Middle School
Rosa Parks Middle School
Pyle Middle School
Redland Middle School
Shady Grove Middle School
Silver Spring International Middle School
Sligo Middle School
White Oak Middle School

About KID Museum

KID Museum is the region's pioneering experiential museum and educational makerspace. We empower the next generation with the skills to invent the future. Through hands-on programming for kids and youth (ages 4-14), we challenge young people to be active makers, not just passive observers.

We design and deliver programs across the full continuum of learning for kids in pre-K through middle school, in partnership with educators and schools. Our weekend onsite programs, community events, and live, virtual sessions encourage families to learn and explore together.

To learn more, please visit: www.kid-museum.org