Understanding Black and Latino Students' Math Engagement

Sharing Research Findings

The Adapted Measure of Math Engagement Project
January 21, 2025

BLOOMINGTON Public Schools
Child Trends
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Agenda and Objectives

1. Welcome
2. Overview of the project
3. Factors of math engagement and reflection activity
4. Wrap up and and next steps

Welcome

Opening Activity

Get to know each other!

Opening Activity

- We’ll go around the room for introductions. Share your name and where you work.
- Take a moment to think about a time when you were highly engaged in your learning or saw high student engagement in your classroom. **What made that moment successful?** Feel free to jot it down on the sheets of paper we provided.
- We’ll have a few people share about their experience of highly engaged learning.

Overview of the Project

Background on the project

Let’s begin by providing context for the Adapted Measures of Math Engagement (AM -ME) project.

The Research Project

Our goals are to...

- Understand Black and Latino students' engagement in math;
- Create a survey of student engagement to better capture Black and Latino student's experiences; and
- Understand how students' math engagement supports academic and socio-emotional outcomes.

The Research Project

Students are engaged in this project in three ways:

Survey responses

We gained math engagement insights from:

- ~2,000 students in Spring 2023.
- ~2,700 students in Spring 2024.

In -depth conversations

We've talked to 169 students in focus groups to discuss:

- Their math engagement
- What high engagement looks like
- How the classroom and their identities inform their experiences in math

Research Group

Six students are part of our Research Group (made up of students, teachers, researchers) which meets regularly to plan, collect data, discuss findings, and make research decisions.

The Research Project

Teachers are engaged in this project in two ways:

In -depth conversations

We've talked to 21 teachers in interviews to discuss:

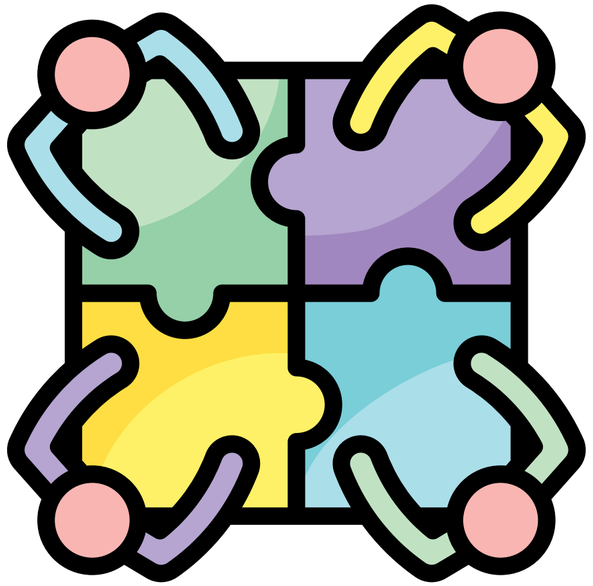
- Their students' math engagement
- The AM-ME survey items (whether they are clear and useful)
- How their classroom and their students' identities inform their students' experiences in math

Research Group

Five teachers are part of our Research Group (made up of students, teachers, researchers) which meets regularly to plan, collect data, discuss findings, and make research decisions.

What is Engagement?

Using insights from the Research Group, our data, and existing literature on engagement, we created this definition of math engagement:



"Math engagement is an active form of instruction and learning that can be demonstrated by listening, participating, feeling present, being willing to learn, collaborating, mutual respect, and feeling a sense of purpose and belonging."

Factors of Math Engagement

Math engagement themes

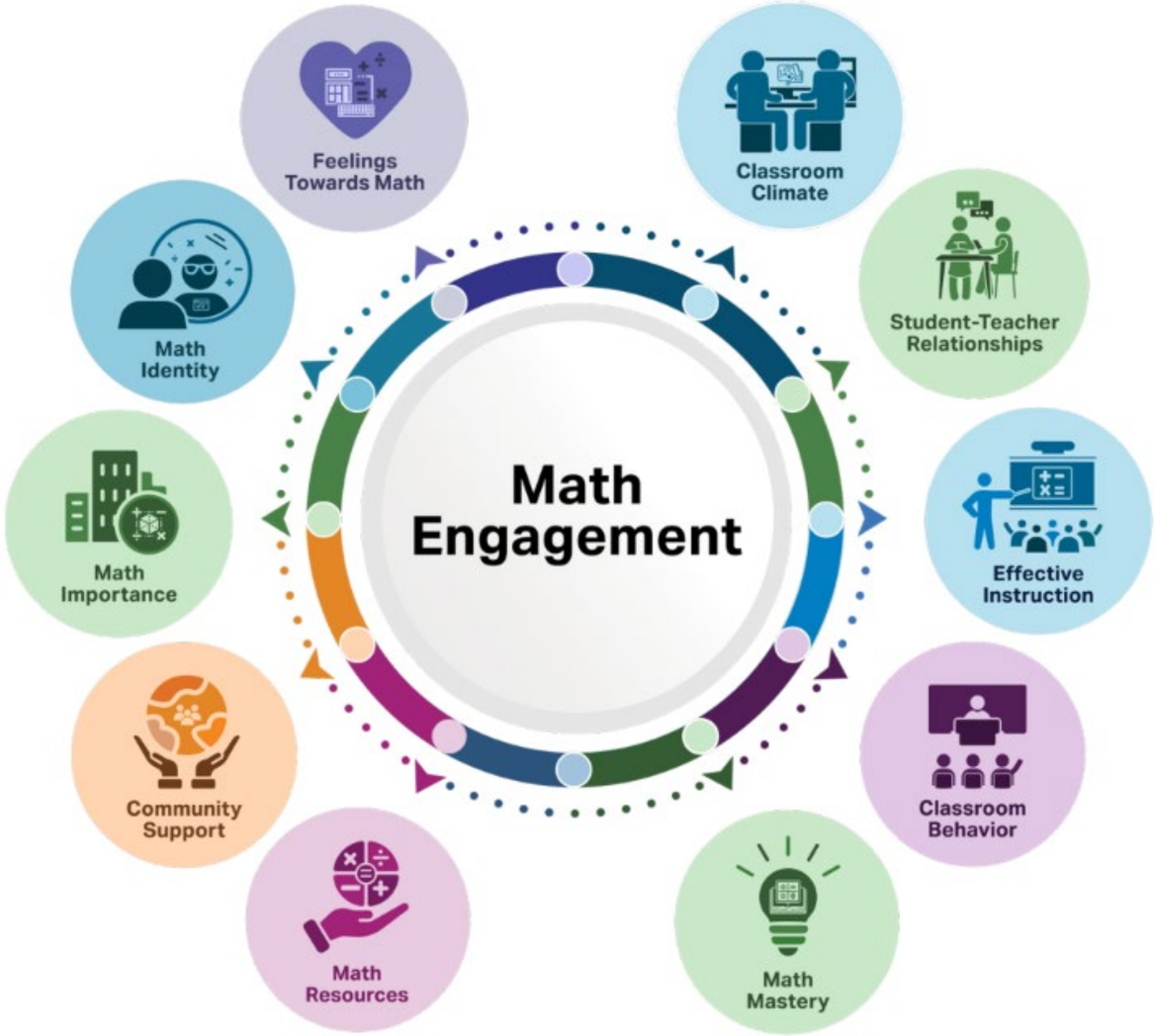
Share themes that emerged from this project about math engagement, including actionable insights.

Reflection activities

After sharing a finding, we'll take time to reflect about what we're learning.

Note that all names have been changed to protect student, teacher, and school identities. Race/ethnicity and gender were self -described by each participant.

Based on the data collected in the first two years of the project, we found 10 emerging themes of math engagement.



We are only focusing on four key themes in this presentation.

Student -Teacher Relationships

Student -Teacher Relationships

This theme refers to the positive and supportive interactions between students and teachers, where teachers show care, provide encouragement, communicate effectively, and build trust.

Student-teacher relationships was commonly discussed as a factor that affects Black and Latino student math engagement.

Student -Teacher Relationships Items

Examples of the items in the survey that address student-teacher relationships are:

- My math teacher takes time to get to know me.
- My math teacher shows me that I matter to them.

Student -Teacher Relationships

Students and teachers identified the importance of check-ins and developing a relationship with one another. This helps students engage more in math.

“I try to support them. I try to be there for them as a **human first** . At the end of the day, if they find safety and support in my classroom and they enjoy being in my space, then they're absorbing more being in my room than they would be acting out and not being in my room.”

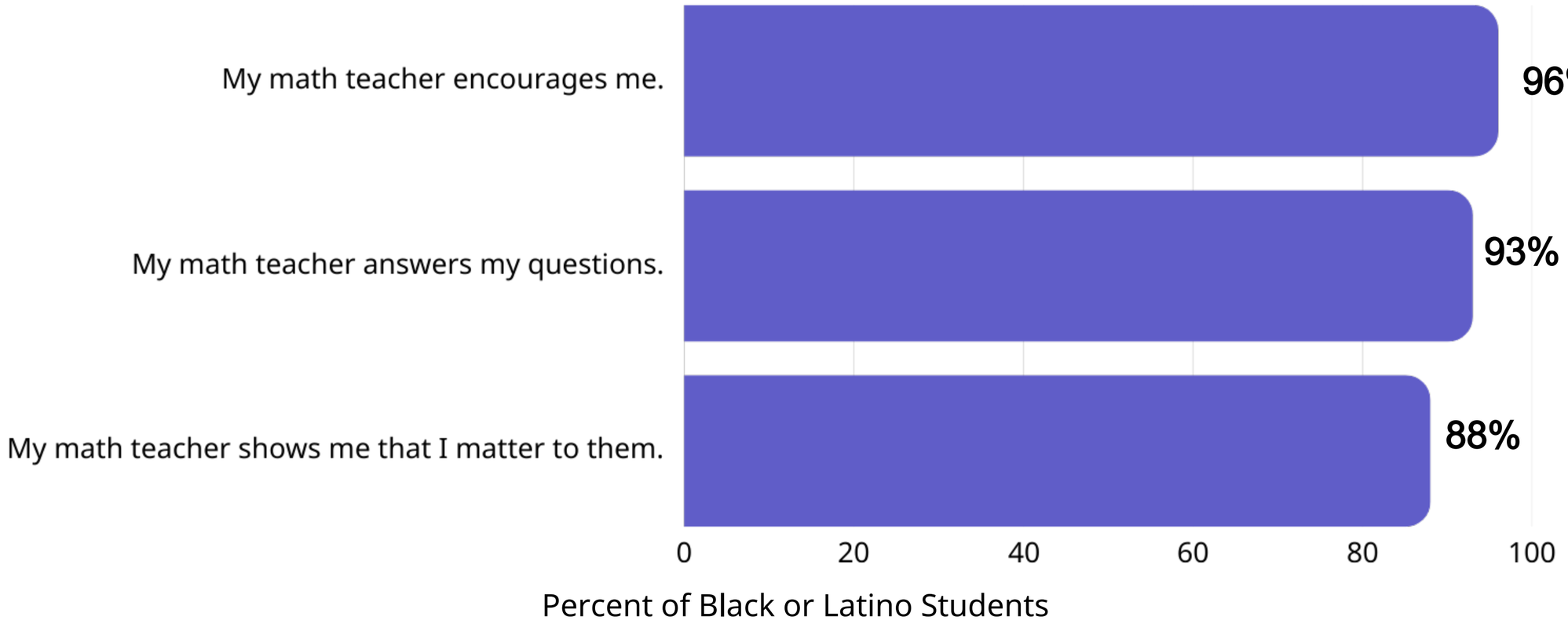
- Meg, a math teacher at César Milstein Middle School

“They talk to us about stuff other than school... And they ask us about **how we're doing personally** and how our day is going. And if we're having an odd day, they'll know that we're having an odd day.”

- Shane, a Black male student at Helen Rodríguez Trías High School

Student -Teacher Relationships

Percent of students who agree with statements measuring student - teacher relationships (2024 survey data).



Nearly all Black and Latino students feel that their math teacher encourages them.

Actionable Insights

What we learned in focus groups aligns with other research that shows **teachers** are one of the most important factors that shape students' math engagement. Positive student-teacher relationships are the *conduit* for learning.

- **Build intentional time** into classes **to get to know students** on a **personal level.**
- Create a **supportive environment** in classrooms by **empowering** students to ask for help and answer questions.
  - Be **consistent** : offer regular opportunities (including "office" hours) to connect and answer student questions.

Insights are intended to directly support math teachers in their classrooms.

Actionable Insights

According to the *Developmental Relationships Framework*, other important approaches to strengthening student-teacher relationships include:

- **Challenge Growth** : Encourage your students to keep getting better and learn from mistakes.
- **Share Power** : Treat your students with respect and give them say.
- **Expand Possibilities** : Connect your students with people and resources that broaden their horizon.

Insights are intended to directly support math teachers in their classrooms.

Reflection Activity

- Using your handout, begin by reflecting on student-teacher relationships. Write down anything that surprised you from the data, questions you may have, or information you want to know more about.
- Now think about a recent or future lesson. Write down one thing you could have or will change/do differently as it relates to student-teacher relationships.
- Finally, think about and write down a new relationship-building strategy that you wish to try.

Math Mastery

Math Mastery

This theme refers to students' **understanding of math concepts.** This finding speaks to *math competency as a core foundation for math engagement.*

A few AM-ME items that speak to this theme are:

- I can explain how to solve a math question step-by-step.
- I want to master the skills we are learning in class.

Math Mastery

Teachers and students mentioned several factors that made understanding math challenging:

- Learning new concepts **too quickly** .
- **Learning loss** from COVID-19.
- **Math's sequential nature** makes it challenging to catch up once foundational content is missed.
- Too much **homework.**
- **Stigma about making mistakes** and what others will think of them.

> “I had a lot of students where they used to just be able to get by on their talent or their knowledge and then suddenly we started doing some things where **they don't have the background knowledge to help them anymore.** And still, same thing, where **they don't know how to study or how to take notes.** And so then that became a challenge for them to be able to show mastery in class because they just haven't learned how to.”
>
> *- Eric, a math teacher at Walter Lincoln Hawkins High School*

Math Mastery

Across data collection, students described the **strategies or approaches** they use to support their math understanding:

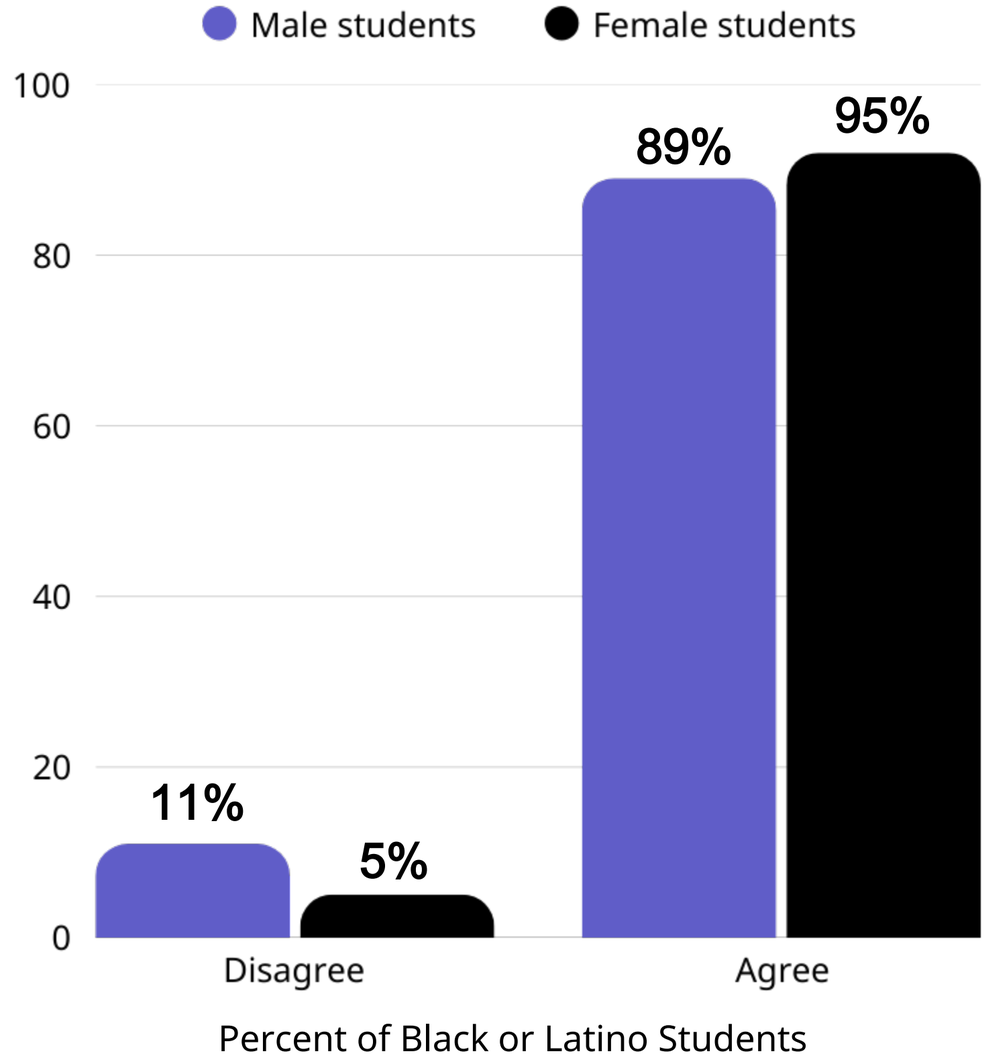
- Paying attention in class
- Taking notes
- Completing homework
- Double-checking work
- Studying
- Asking the teacher for clarity

When students understand math concepts, they described feeling confident and happy, which makes them more engaged in math.

> *"I used to be really bad at math...I used to always talk to my friends and just mess around, I guess. But then I realized that I have to start paying attention. So that's what I started doing, like actually* ***doing my homework and paying attention to class*** *. That's what made me better."*
>
> *- Vanessa, a Mexican female student at Alexa Canady Middle School*

Math Mastery

Responses to “I want to understand math” (2024 survey data).



Female students are **more likely to agree** that they want to understand math, compared to male students.

Actionable Insights

- **Conduct daily pulse checks** on how quickly you're moving through lessons and units to make sure all your students feel like they're able to follow along and comprehend the material.
  - During these checks, assess students' understanding and well-being, including any signs of stress.
- Additionally, **offer opportunities for 1:1 or small group sessions** outside of class time for students who may need extra support in understanding the content.

Insights are intended to directly support math teachers in their classrooms.

Actionable Insights

- **Normalize making mistakes in your classroom environment.** Creating an environment where it is normal to make mistakes can help the frustration from turning into stress and falling behind.
  - This also helps nurture your students' **growth mindset** by encouraging them to make mistakes and learn from them.

Insights are intended to directly support math teachers in their classrooms.

Reflection Activity

- First, using your handout, begin by individually reflecting on math mastery. Write down anything that surprised you from the data, questions you may have, or information you want to know more about.
- Pair up with a person sitting near you.
- Now think about a recent or future lesson. Write down one thing you could have or will change/do differently as it relates to math mastery.
- In your pair, share your reflections.
- Finally, think about and write down a pulse check/check-in strategy that you wish to try in the next week.

Math Importance

Math Importance

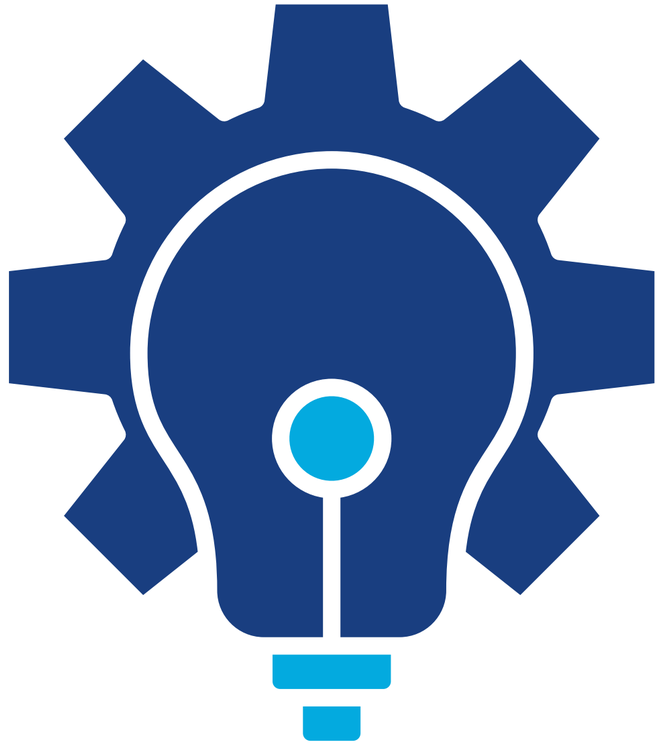
This finding refers to how useful and valuable students perceive math to be in their daily lives, future careers, and in addressing real-world and community issues.

Students' perceptions of the usefulness of math affects their level of engagement.

Math Importance Items

The following quotes about math relevance informed the AM-ME. Some of the items in the survey related to math relevance are:

- I understand ways I can apply math in my life.
- I feel my math class addresses issues that are important to my community.



Math Importance

Several students cited instances where math is and can be useful in everyday life. They were **most engaged in math concepts related to their interests.**

“You could also use it in baking or in art. For baking, measuring amounts, for art **scaling up a drawing, putting it on a grid system, and then calculating it on a grid system.”**

- Willow, a German, Spanish, Swedish, Native student at Alexa Canady Middle School

Math Importance

Many students **expressed enjoyment** when they engaged in math that **related to their future** .

“I think algebra is very important, especially since it-- we learn a lot about, like, plugging in stuff, **which is something that you will probably use in the real world** .”

- Tomas, a Hispanic male student at Walter Lincoln Hawkins High School

Math Importance

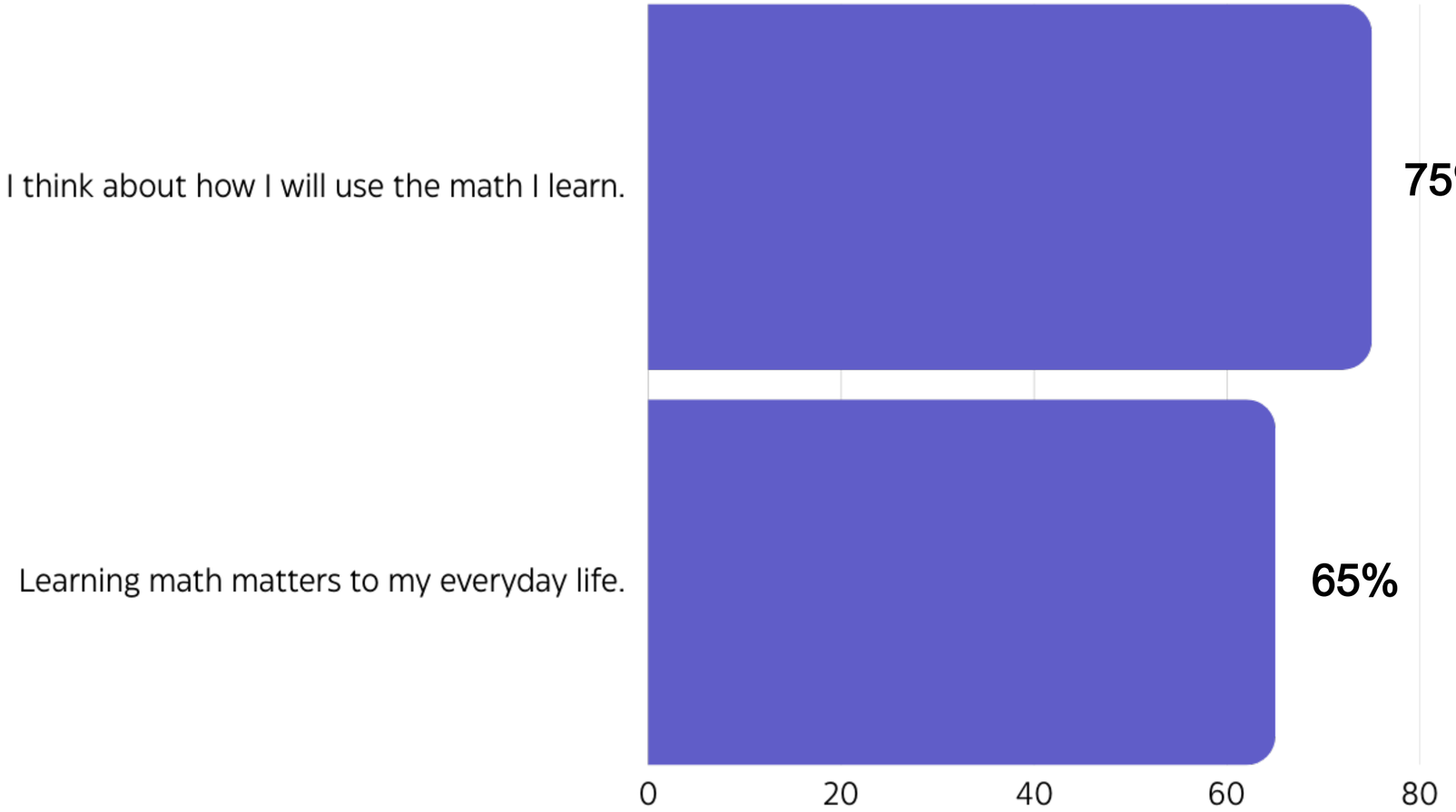
However, when students **don't understand** how to use the math they learn, they described **feeling frustrated** which is a barrier to their engagement.

"While I'm learning, I'm like, **'When am I going to have to use this form?'** Especially because technology is so advanced. **I don't think I'm going to have to break down equations like that...** Like the quadratic formula. **I don't think I'm just going to stop in the middle of the day to break down the quadratic formula."**

- Lauren, a Black female student at Walter Lincoln Hawkins High School

Math Importance

Percent of students who agree with statements measuring the importance of math to everyday life (2024 survey data).



More students think about **how they will use math (75%)** than think that **learning matters to their everyday lives (65%).**

Actionable Insights

- **Brainstorm with students to identify ways that math is already an important part of their lives.**
  - Introduce students to math **role models** that resemble your students' backgrounds.
  - Use **culturally relevant math examples** that connect what you teach in your classroom to students' lived experiences.
- **Connect math to real -life situations** to demonstrate the everyday applicability of math.
  - Examples can include budgeting, shopping discounts, planning travel routes, measuring ingredients.
- Additionally, **connect math to their interests** . By relating math to sports, games, pop culture, and more, students will see more value in math, thereby supporting their engagement.

Insights are intended to directly support math teachers in their classrooms.

Reflection Activity

- First, using your handout, begin by individually reflecting on math importance. Write down anything that surprised you from the data, questions you may have, or information you want to know more about.
- Pair up with a different person sitting near you.
- Now think about a recent or future lesson. Write down one thing you could have or will change/do differently as it relates to math importance.
- In your pair, share your reflections.
- Finally, think about and write down ways you can encourage students to think about how math applies to their lives and communities.

Classroom Climate

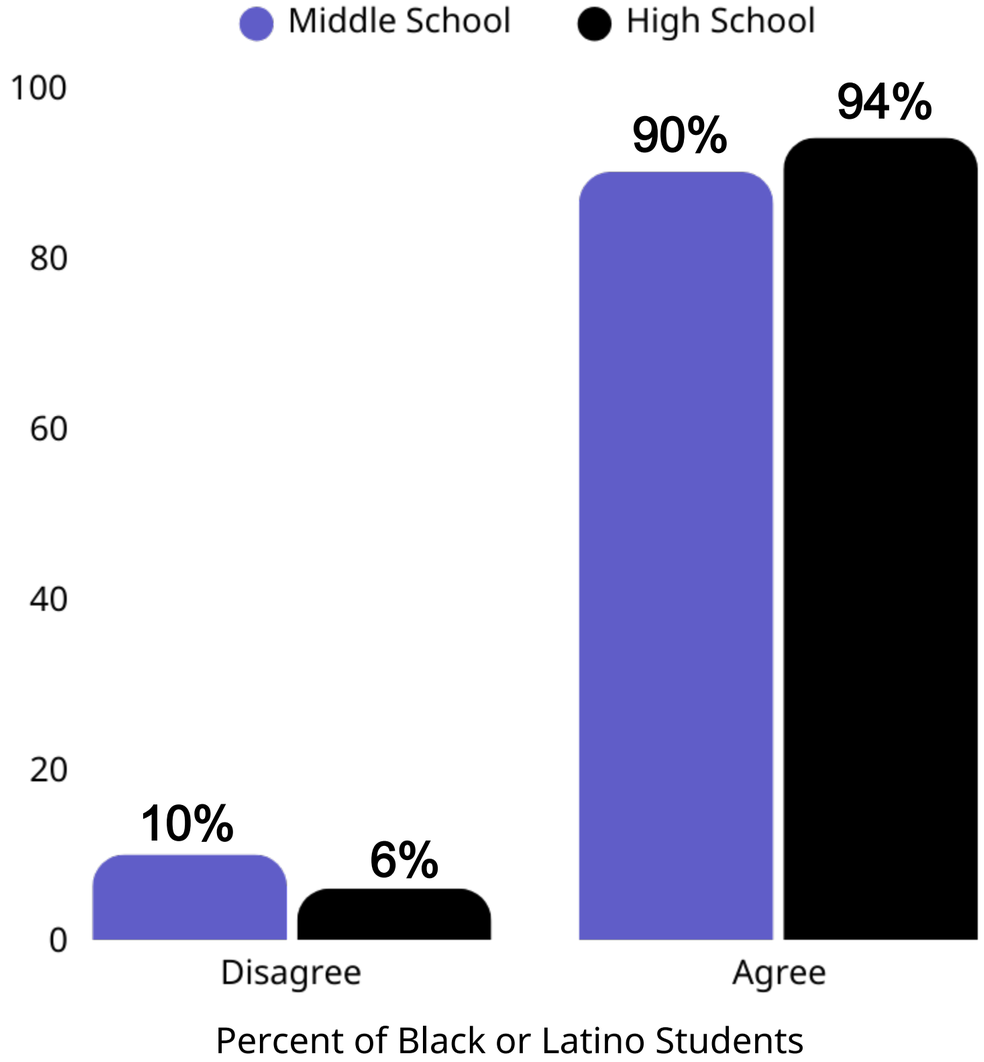
Classroom Climate

This finding refers to the positive, respectful, and supportive environment in a math class.

Students frequently describe how the conditions of their classroom impact their level of engagement in math class.

Classroom Climate

Responses to “In my math class I feel safe” (2024 survey data).



10% of middle school students did not feel safe in their classrooms.

Classroom Climate

Students described classroom climate as important to their math engagement, particularly when it is an environment where they can be themselves, feel comfortable asking the teacher questions, and can get help when needed.

> **“There are times…where I didn't ever get to ask the teacher questions** . And when I wanted to ask them, I was passing time and I had to get going because of my class is, like, on the other side of the school. And so I couldn’t ask the question and, on the day of the test, I was getting, like, B’s on the tests.
>
> - *Salmi, an African American female student at Walter Lincoln Hawkins High School*

Classroom Climate

It was also important to a lot of students, and a few teachers, that they feel able to work with and ask questions of their peers in math class.

“**Me and my friend, we always help each other** because we ask our teacher to sit next to each other because **we know how to help each other in the ways that both of us know** . And then one of us is wrong, but the other one will know what to do. So it's really fun and you learn faster with them.”

- Bella, a Hispanic Ecuadorian female student at Katherine Johnson Middle School

Actionable Insights

- **Develop classroom expectations, ideally with your students.** Ask and receive information about the type of environment that will best help them learn math. Uphold these expectations and reference them throughout the year.

- **Create time and space for students to ask you questions.** Being open and grateful for students who ask for help can go a long way. If students don't ask you for help, reflect on why and ask how you can better support them.

Insights are intended to directly support math teachers in their classrooms.

Reflection Activity

- Get into a small group of about 3-5 people.
- First, using your handout, begin by individually reflecting on math classroom climate. Write down anything that surprised you from the data, questions you may have, or information you want to know more about.
- Now think about a recent or future lesson. Write down one thing you could have or will change/do differently as it relates to classroom climate.
- In your small group, share your reflections.
- Finally, think about and write down a classroom expectation you hope to establish or reestablish in your classroom.

Wrap Up + Next Steps

What's happening in 2025

This research project is still ongoing!

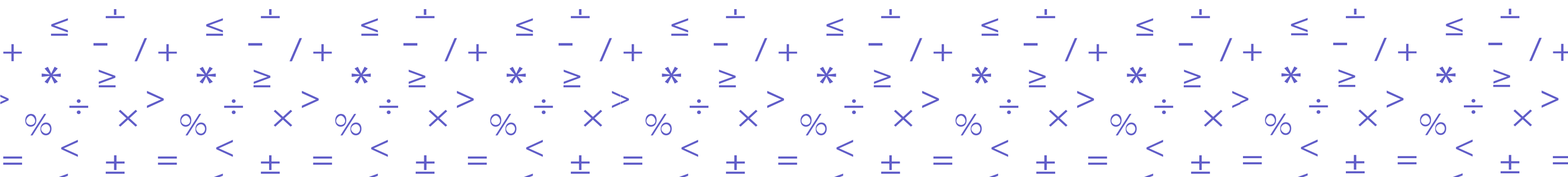
Stay in touch

Our contact info for any questions or ideas that come up about this project and our findings.

Wrap Up & Next Steps

The project continues and we have some exciting next steps ahead:

- **Spring 2025** : Conduct AM-ME survey.
- **Fall 2025:** Share findings from Year 3 data collection and survey, including a meaning making toolkit to support teachers and students in math classrooms.



Wrap Up & Next Steps

Do you want more information? We have a project webpage with additional resources and learnings:
https://www.childtrends.org/project/adapted-measure-of-math-engagement

Questions? Feel free to contact us!
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The Adapted Measure of Math Engagement Research Group includes six students (Antonio Chavira, Brianna Espy, Ryan Ombongi, Serrah Ssemukutu, Salma Ahmed, and Diamond Tony-Uduhirinwa), five teachers (Nathan W. Earley, Karina Mazurek, Kathleen Morgan, Karla Rokke, and Ashly Tritch), and five researchers (Marisa Crowder, Samantha E. Holquist, Diane (Ta-Yang) Hsieh, Claire Kelley, and Mark Vincent B. Yu). Researchers Alyssa Scott, Olivia Reyes, and Avalloy McCarthy also extensively contributed to this work. Bloomington Public School District leaders Betsy Hawes, Marcie Coval, Julio Caesar, and Rik Lamm provided support to this work. Jennifer Widstrand served as the project manager.

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