



The Education Trust

**EQUAL**  
OPPORTUNITY  
SCHOOLS

APRIL 2022

# SHUTOUT

WHY  
BLACK AND LATINO  
STUDENTS ARE  
**UNDER-ENROLLED**  
IN AP STEM  
COURSES



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*Special thanks to the Amgen Foundation for providing support for this project.*

# SHUT OUT

## Why Black and Latino Students Are Under-Enrolled in AP STEM Courses

### EXECUTIVE SUMMARY

**FOR THIS REPORT, THE EDUCATION TRUST TEAMED UP WITH EQUAL OPPORTUNITY SCHOOLS TO LOOK AT STUDENTS' ACCESS TO ADVANCED PLACEMENT COURSES IN SCIENCE, TECHNOLOGY, ENGINEERING, AND MATH (STEM).**

We found that although many Black and Latino students aspire to go to college and are interested in STEM subjects, very few are actually enrolled in AP STEM courses that would prepare them for college and a STEM career. This new research, based on survey data from approximately 200,000 students from various backgrounds across 184 schools, also indicates that a positive and inviting school climate plays an important role in getting more Black and Latino students into advanced courses.

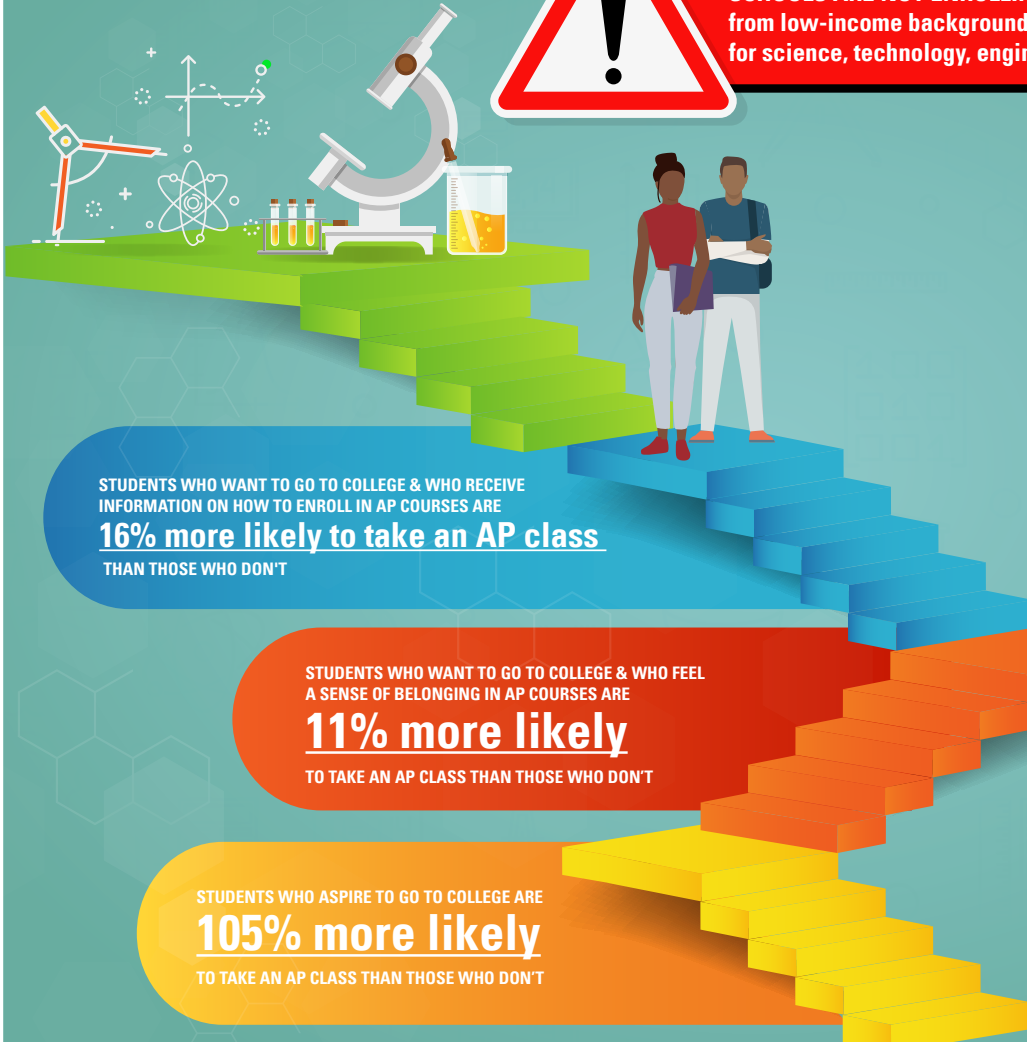
Fortunately, there are many policies and practices that school, district, and state leaders can implement to remove the systemic barriers and conditions that shut Black and Latino students out of advanced STEM courses. This report includes recommendations on how to advance equity in access to and success in advanced coursework, including creating positive school climates where students of color feel safe, have a sense of belonging, and see themselves reflected in the curriculum.

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**SCHOOLS ARE NOT ENROLLING Black and Latino students and students from low-income backgrounds in advanced courses that prepare them for science, technology, engineering, and mathematics (STEM) fields.**



STUDENTS WHO WANT TO GO TO COLLEGE & WHO RECEIVE INFORMATION ON HOW TO ENROLL IN AP COURSES ARE **16% more likely to take an AP class** THAN THOSE WHO DON'T

STUDENTS WHO WANT TO GO TO COLLEGE & WHO FEEL A SENSE OF BELONGING IN AP COURSES ARE **11% more likely** TO TAKE AN AP CLASS THAN THOSE WHO DON'T

STUDENTS WHO ASPIRE TO GO TO COLLEGE ARE **105% more likely** TO TAKE AN AP CLASS THAN THOSE WHO DON'T

**2** IN **5**

**BLACK AND LATINO STUDENTS SAY THEY REALLY ENJOY STEM COURSES AND ASPIRE TO GO TO COLLEGE**

**BUT**

**LESS THAN 3% ARE ENROLLING IN AP STEM COURSES**



# SHUT OUT

## Why Black and Latino Students Are Under-Enrolled in AP STEM Courses

AUTHORS: Kayla Patrick; Jonathan C.W. Davis, Ph.D., and Allison Rose Socol, Ph.D.

*"I got [interested in science](#) when I was 16 years old. I was hooked on the idea that you could go to work and discover something that no one else in the world knows on any given day."*

—DR. KIZZMEKIA CORBETT, ASSISTANT PROFESSOR OF IMMUNOLOGY AND INFECTIOUS DISEASES,  
HARVARD T. H. CHAN SCHOOL OF PUBLIC HEALTH

### INTRODUCTION

**AT 16 YEARS OLD**, Dr. Kizzmekia Corbett was a student at Orange High School in Hillsborough, North Carolina. She was participating in Project SEED, a program for students of color that gave her access to research labs on a nearby college campus. And she was excelling in the advanced courses that would prepare her to go on and earn a BS, an MS, and a Ph.D. She was also telling people that she was going to be the first Black woman to win the Nobel Prize in Medicine.<sup>2</sup>

At 36 years old, Corbett has not won the Nobel *yet*, but she has helped revolutionize medicine and saved millions of lives as one of the scientists behind the innovative COVID-19 vaccines. Last December, *Time* magazine named her and three others as the 2021 Heroes of the Year. They call them "The Miracle Workers."

Dr. Corbett is like many aspiring young Black and Latino students across the nation who show a love for science early on and express an interest in pursuing it as a career. They, like a young Corbett, want to discover something new, to make a difference, to help their families and their communities. (Corbett has said it was important for her to make sure Black people were included in clinical trials. Since the vaccines were approved, she has been actively advocating against vaccine hesitancy.<sup>3</sup>)

A 2020 Education Trust report estimates that nearly [225,000 Black and Latino students](#) are missing out on advanced courses they should otherwise have access to while in high school.<sup>4</sup> Earlier Ed Trust reports examine both Advanced Placement and International Baccalaureate participation rates nationally and by school and the findings are the same: hundreds of thousands of students of color and students from low-income backgrounds are missing out on advanced coursework opportunities that would challenge and engage them and prepare them for college.<sup>5</sup>

In this new report, we teamed up with Equal Opportunity Schools — a nonprofit organization that partners with school, district, and state leaders to close race and income enrollment gaps in AP and IB programs — to look specifically at access to AP courses in science, technology, engineering, and math (STEM). We analyzed student survey data, administrative school files, school course enrollment, and interviewed 10 school leaders and educators across six districts to help contextualize the data. EOS uses student and staff surveys to create an alternative student identification methodology allowing their partner schools to broaden the definition of readiness beyond GPA and test scores. We found that Black and Latino students and students from low-income backgrounds are being denied access to AP STEM opportunities such as AP Biology, AP Physics, and AP Chemistry, *despite* voicing interest in going to college and pursuing a career in a STEM field. In fact, our analysis shows that for many Black and Latino students, STEM courses are their favorite subject areas.

Why then are they not enrolled in these courses?

Oftentimes, education leaders rely on a student's persistence or make assumptions about a student's intelligence instead of addressing systemic [barriers](#)<sup>6</sup> and conditions that make it difficult, and in some cases impossible, for students to enroll, including a failure to address school climates that make underserved students feel unwelcomed in these courses. In addition, schools rely on single denominators of readiness, such as GPA and test scores, which further narrows who is granted access. To increase enrollment of students of color in AP STEM courses, leaders must create positive school climates where students of color feel safe and have a sense of belonging, where they interact with adults who have high expectations for them, where they receive adequate information on how to access AP STEM opportunities, and where they engage in rigorous, culturally relevant, and identity-affirming curricula.

Conversations about school and classroom environments have been largely absent in national efforts to increase the number of students of color in STEM careers. As a result, leaders have not been encouraged to examine the climate and cultures that leave Black and Latino students in negative school environments and outside of AP STEM classrooms.

By failing to remove the barriers that limit access to STEM courses, education leaders and policymakers are missing an opportunity to nurture students' aspirations and interests and position them to thrive in both AP STEM courses and future careers. If we consider Dr. Corbett's path, it's difficult to underestimate the impact of this failure. These students are the future "miracle workers" who could very well discover something that no one else knows, and, in the process . . . save the world.

## WHY FOCUS ON AP STEM ENROLLMENT?

Today, Black and Latino adults are underrepresented in STEM careers. According to the [Pew Research Center](#), Black people represent 11% of the workforce but are only 9% of those in STEM jobs. Similarly, Latino people make up 17% of the workforce but only 8% of those in STEM jobs. Considering that Black and Latino people are less likely to earn degrees in STEM fields than any other field, the prospect of reversing this trend is dim unless significant changes are made.<sup>7</sup>

The result is a STEM workforce that lacks diversity. Research shows that workplace diversity drives innovation, workplace culture, and productivity and that the companies with more racial and gender diversity [outperform companies](#) with less diversity.<sup>8</sup> The pandemic revealed an immediate and urgent need to diversify STEM fields. As leaders struggle to mitigate the disproportionate impact the pandemic continues to have on communities of color, they need to build trust with racially diverse communities and ensure that people from and with connections to underserved communities are in positions to make decisions that will best meet these communities' needs. [Studies](#) show scientists of color are more likely to work on problems with a clear focus on finding equitable solutions.<sup>9</sup> And Black and Latino students [do not just pursue STEM because of the financial benefits](#);

they want to make a positive difference in the world, and for the many underserved communities across the world.<sup>10</sup>

Consider too the economic benefits of STEM careers that Black and Latino people are missing out on and could continue to miss out on since STEM jobs are expected to outpace jobs in non-STEM fields. These jobs often come with higher paying salaries that, over time, could help close the racial wealth gap that finds [Black households to have only a fraction of the wealth](#) of White households.<sup>11</sup>

Increasing the number of people of color in STEM careers must start years before they enter the workforce. It must start by giving them the opportunity to engage in rigorous and advanced STEM courses in K-12 classrooms. Research shows that early interest in math and science is a key indicator of whether students pursue STEM pathways later. One study of graduate students found that 65% of those asked said their interest in STEM began before middle school.<sup>12</sup>

Middle and high schools, especially, are the entryway to STEM careers. Access to advanced math courses in middle school gives students the prerequisites for AP STEM courses like AP Biology, AP Physics, and AP Chemistry. And students who are exposed to more rigorous classes, including AP classes, are more likely to choose STEM careers. In fact, more than half of STEM college majors said they decided on their major before they left high school.<sup>13</sup>

Unfortunately, in schools and classroom across the nation, too many Black and Latino students and students from low-income backgrounds are being denied these opportunities.





# ABOUT OUR ANALYSIS

WE ANALYZED STUDENT SURVEY DATA, administrative school files, and school course enrollment data from Equal Opportunity Schools, a nonprofit organization that partners with school, district, and state leaders to close race and income enrollment gaps in AP and IB programs. Data for this investigation is from AY 2019-2020.

For part one of our analysis, we used data from 24 states and approximately 80 school districts across the country to calculate the percentage of Black and Latino students and students from low-income backgrounds in each district who are interested in STEM (i.e., those who name STEM courses as favorite subjects on a student survey) and who aspire to go to college. Next, we calculate the percentage of Black and Latino students and students from low-income backgrounds in each district that have taken an advanced STEM course — AP Biology, AP Chemistry, or AP Physics: Algebra 1 based course. Together, these statistics provide us with a sense of whether STEM-interested and college-aspiring students from these backgrounds are proportionally represented in the types of advanced STEM courses that are reflective of their interests and aspirations.

For part two, we investigated how likely a student was to take an AP course while in high school based upon their background (e.g., gender, race, socioeconomic status), their interests and aspirations (e.g., aspire to go to college), the climate of and conditions present within their school (e.g., information sharing, whether students feel as though they belong, and whether courses are rigorous), and the demographic make-up of their school (e.g., % of low-SES students, % of students of color, and the overall size of school). Data used in this analysis originates from a student survey administered by Equal Opportunity of Schools in fall 2019. Our final sample contained approximately 200,000 students from various backgrounds and who were situated in 184 schools.

Using this information, we identified districts and schools that had both done an exceptional job and that struggled with enrolling STEM-interested and college-aspiring Black and Latino students and students from low-income backgrounds in the aforementioned courses. Once identified, and in close collaboration with our partners at EOS, we interviewed several school leaders who contextualized the data trends we uncovered. Excerpts from these interviews are shared throughout this report.

For more information on the analysis procedure, please see the Technical Appendix.

# PART ONE

MEETING STUDENTS'

ASPIRATIONS AND INTERESTS

# FINDING #1

**Black and Latino students really enjoy STEM and aspire to go to college**

# FINDING #2

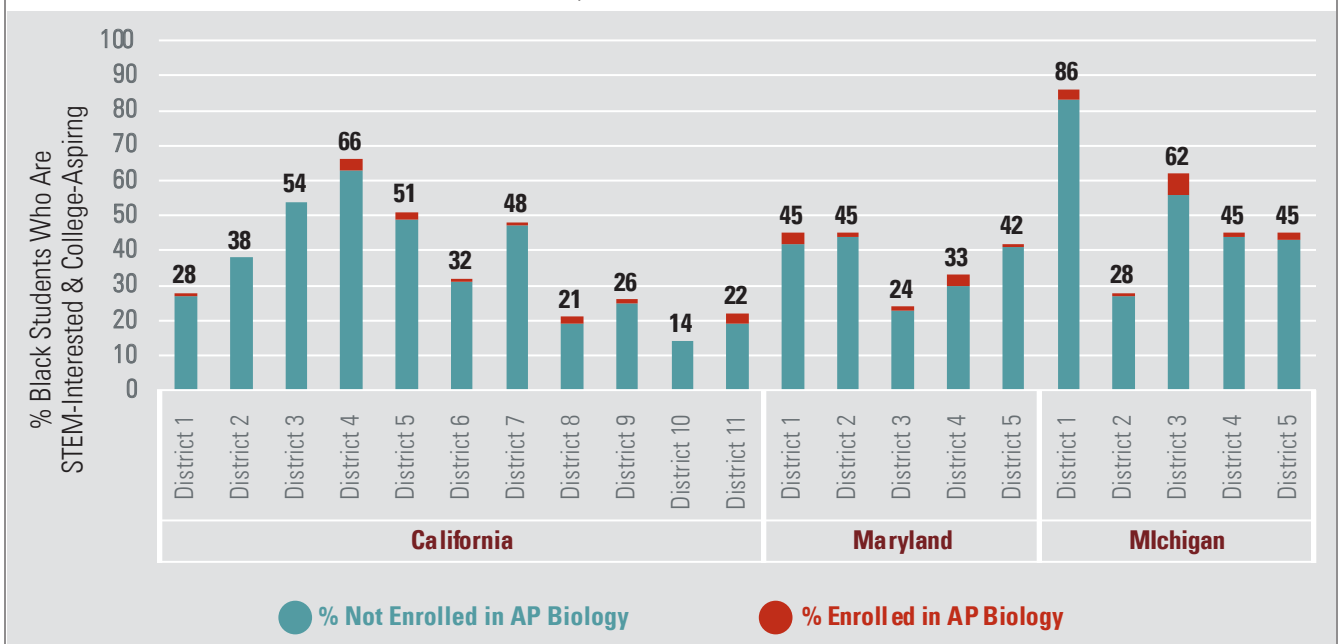
**Even though Black and Latino students are interested in college and STEM courses, very few of them are actually enrolled in Advanced Placement STEM courses.**

OUR RESEARCH AND FINDINGS ARE CLEAR that under-enrollment in advanced courses is not a reflection of a lack of interest on the part of Black and Latino students and students from low-income backgrounds. Rather, across our sample, these students voiced that STEM courses are their favorite subject areas and that they aspire to continue their education beyond high school by going to college.

On average, roughly 2 in 5 (or 40%) of the Black and Latino students in our sample and 1 in 4 (or 25%) of the students from low-income backgrounds in our sample aspire to go to college and name STEM subjects as their favorites.

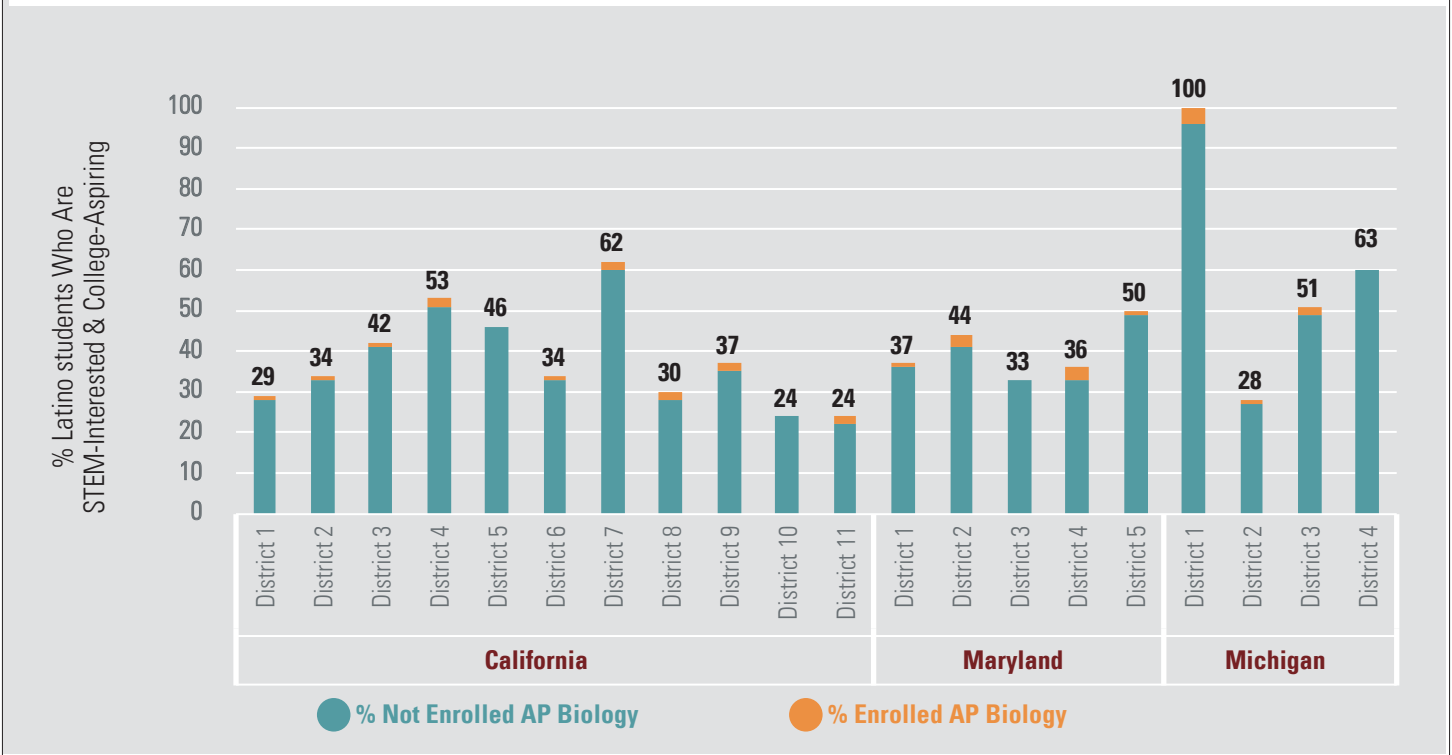
Based on these reasons, these students should be enrolling in advanced STEM courses. But we find that they are not. Only a fraction of these students is actually enrolled in **AP Biology** (less than 2% for Black and Latino students and students from low-income backgrounds), **AP Chemistry** (less than 1% for all groups), or **AP Physics 1: Algebra based** (less than 2% for all groups). To put into perspective the discrepancy between students' interests and aspirations and their actual rates of enrollment in advanced courses, consider Figures 1, 2, and 3 as shown below. In each figure, we present the proportion of STEM-interested and college-aspiring Black and Latino students and students from low-income backgrounds compared to the proportion of students from those backgrounds who were enrolled in AP Biology. We focus on three states where the discrepancies are especially pronounced: California, Maryland, and Michigan. The data is shocking and heartbreaking when considering the full personal and societal weight of these missed opportunities for Black and Latino students and students from low-income backgrounds.

**FIGURE ONE:** PERCENTAGE OF BLACK STUDENTS WHO ARE STEM-INTERESTED AND COLLEGE-ASPIRING, BY ENROLLMENT STATUS IN AP BIOLOGY

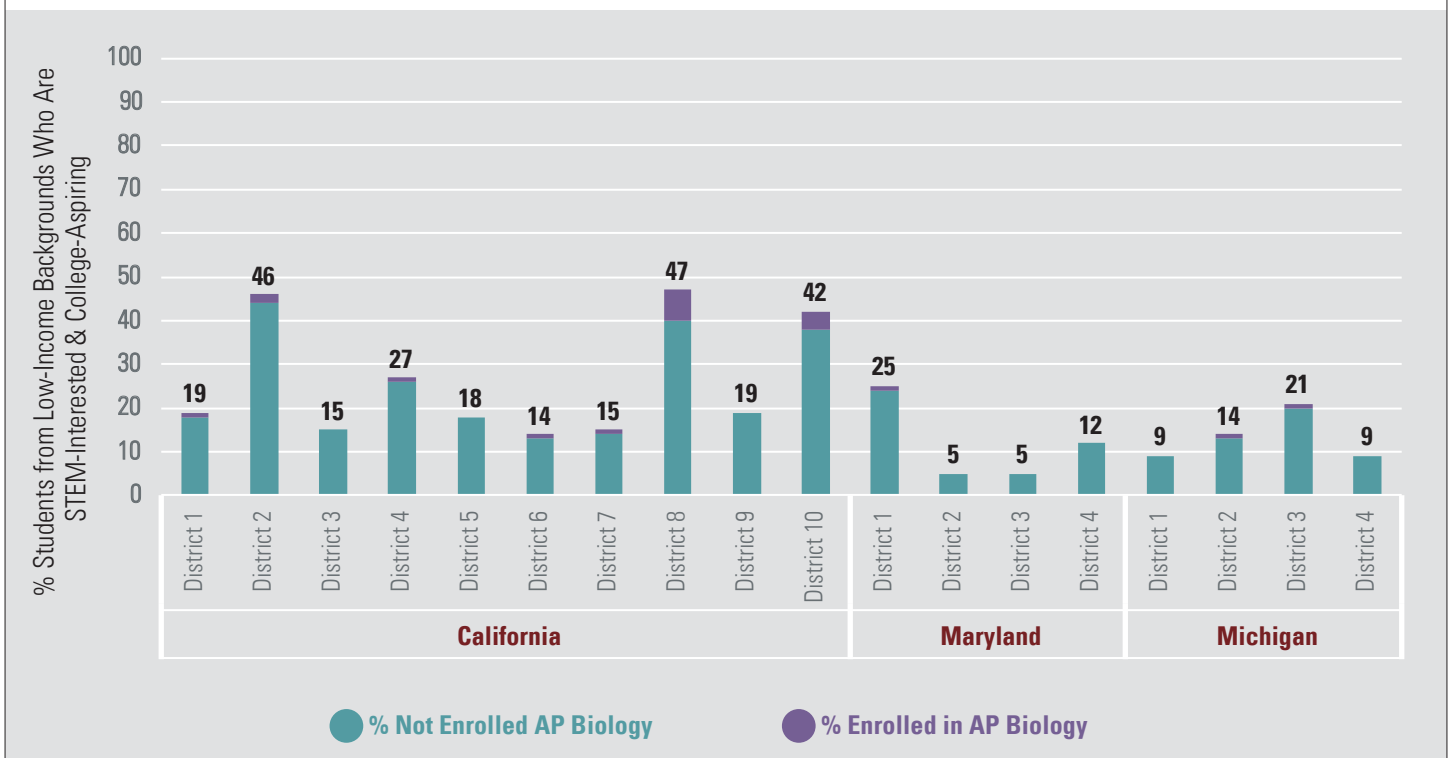


Reading this figure: In District 4 in California, 66% of Black students in our sample aspire to go to college and are interested in STEM. But, less than 3% of these students are enrolled in an AP Biology course.

**FIGURE TWO:** PERCENTAGE OF LATINO STUDENTS WHO ARE STEM-INTERESTED AND COLLEGE-ASPIRING, BY ENROLLMENT STATUS IN AP BIOLOGY



**FIGURE THREE:** PERCENTAGE OF STUDENTS FROM LOW-INCOME BACKGROUNDS WHO ARE STEM-INTERESTED AND COLLEGE-ASPIRING, BY ENROLLMENT STATUS IN AP BIOLOGY



There are five Michigan districts in Figure 1 but only four in Figures 2 and 3. This is a function of district enrollment data. In our sample, only four districts in Michigan reported enrollment data for Latino students and students from low-income backgrounds in AP Biology.



# SYSTEMIC BARRIERS TO ADVANCED PLACEMENT STEM COURSES

The under-enrollment of Black and Latino students and students from low-income backgrounds in AP STEM courses has been linked to several factors:

**Funding inequities**, for one, contribute to schools serving Black and Latino students having fewer seats in advanced courses. School districts serving the largest populations of Black, Latino, or Native students [receive 13%](#) less per student in state and local funding than those serving the fewest students of color. This may seem like an insignificant amount, but it adds up. For a school district with 5,000 students, this gap equals a shortage of \$9 million per year.<sup>14</sup>

Even if schools do have an adequate number of advanced courses available, **educator bias and mindsets** often limit students' access. EOS school leaders working to increase enrollment in advanced coursework opportunities emphasized the importance of adults having high expectations for students, as well as the need to meet educators where they are in helping them overcome mindsets that when left unchecked might limit access:

*"If you really believe truly that [students] can do it, it just shifts the conversation. So, I do think that core beliefs in key areas like on our counseling team, our scheduler, and our administrators is critical."*

—PRINCIPAL, OREGON

*"You have to listen to your teachers and genuinely hear where they're coming from, and then help them overcome this fixed mindset because a lot of them do have one."*

—PRINCIPAL, CALIFORNIA

*"International Baccalaureate classes are pretty lofty and there are some members of our teaching staff, counseling staff, and even our community that will say, 'Our kids can't do that.' 'Wow, looks great, would be wonderful, but I don't think we're there.' And so, there's a lot of education that we have to do in convincing people that, you know what? Yes, our kids can. And even if maybe they can't at the end, they deserve a chance to try."*

—IB PROGRAM COORDINATOR, CALIFORNIA

**Racialized tracking** in the early grades is also a barrier to AP STEM enrollment. As early as elementary school, students of color and students from low-income backgrounds do not receive the same opportunities to enroll in advanced STEM courses as their more affluent and White peers. For example, the disproportionate enrollment in advanced courses in high school mirrors disproportionate enrollment in gifted and talented courses in elementary and middle schools.<sup>15</sup>

Yet, having access to a more rigorous and challenging curriculum and high-quality instruction in the early grades, is likely to drive interest, bolster success, and foster identities in students as belonging or fitting in to science fields. By failing to offer these courses in middle school and expose students to a rigorous and engaging curriculum, schools are subtly turning students away.

Fortunately, there are several policies and practices that school, district, and state leaders can implement to remove these barriers. **Part Three** of this report includes recommendations to advance equity in access and success in advanced coursework. In addition, previous Ed Trust reports provide greater detail on the scope of these challenges, as well as what's driving them and what leaders can do.<sup>16</sup>

While it is necessary for state, district, and school leaders to adopt and implement policies that remove barriers that prevent Black and Latino students and students from low-income backgrounds from accessing AP courses, they must also ensure that the school environments within which these policies are to be adopted are safe, inclusive, and welcoming for students from these backgrounds. Failing to do so may undermine the policies and their intent. In **Part Two** of this report, we examine the relationship between school climate and AP access and highlight factors that increase the likelihood that students of color will enroll.



# PART TWO

**CREATING A POSITIVE**

**SCHOOL CLIMATE**



## FINDING #1

**Students are more likely to take an AP class when they aspire to go to college.**

## FINDING #2

**Students who aspire to go to college are more likely to take an AP class when they are given adequate information on how to enroll in those courses.**

## FINDING #3

**Students who aspire to go to college are more likely to take an AP class when they feel like they belong in the class.**

A POSITIVE SCHOOL CLIMATE INCLUDES positive relationships among and between staff and students, a safe environment where students feel they belong, and where they receive equitable supports to meet high expectations. In a school with a positive school climate, all students must have the opportunity to be challenged to reach their full potential.

In our research, we find that school climate matters greatly in helping students access advanced coursework opportunities, especially when they build upon students' interests and aspirations.

Many students aspire to further their education beyond high school, and these aspirations influence whether a student will take an AP course. But our findings highlight the magnitude of this effect. That is, students who aspire to go to college are 105% more likely to take an AP class than those students who do not aspire to go to college.

Aspirations, however, are just one part of the story. Students in our sample who aspire to go to college are 16% more likely to take an AP class when they are given adequate information on how to enroll in AP classes. Also, students who aspire to go to college are 11% more likely to take an AP class when they feel as though students that look like them are welcomed in AP classes.

In short, a positive school climate supports higher enrollment in AP classes among those who aspire to go to college. Importantly, this relationship does not change, regardless of school size, the proportion of students from low-income backgrounds, or the proportion of Black and Latino students within the school.

Too often, however, students of color do not experience positive school climates. They face stereotypes that make them feel like they don't belong in academic spaces, like advanced STEM classrooms, so they are [less motivated to engage academically](#).<sup>17</sup> But when educators and school leaders do not see the assets that a student is bringing into the classroom, the responsibility is on the adults to examine their own biases and make changes to policies and practices to improve students' learning environment.



## ASPECTS OF A POSITIVE SCHOOL CLIMATE FOR EQUITABLE ACCESS TO ADVANCED COURSES

To increase enrollment in advanced courses, especially advanced STEM courses, educators and school leaders must work to create positive school climates where students of color feel safe and have a sense of belonging, where they interact with adults who have high expectations for them, where they receive adequate information on how to access STEM opportunities, and where they engage in a rigorous culturally relevant and identity-affirming curriculum.

### **Information-Sharing and College-Going Cultures**

Positive school cultures where college is emphasized, or “college-going cultures,” are information and resource-rich environments designed to assist all students in their journey of preparing for, enrolling in, and graduating from college. As mentioned above, our findings show that giving students adequate information about enrolling in AP classes increases the likelihood that they will do so. EOS educators and school leaders stressed the importance of sharing information about the benefits of advanced STEM coursework and how to access those courses with students as well as their families.

*“We’re not providing the information [students] need to make informed decisions about college and career readiness and college guidance. So, we immediately started changing things. We founded [a new parent affinity] group. They’ll show up at our eighth-grade family night and back-to-school nights. They serve as both a landing spot for new members to the community, but also, they serve to help translate resources for us, to help navigate and give people advice through college guidance workshops. And it’s been, I think, a huge gain for our community, and really informative for us.”*

—PRINCIPAL, CALIFORNIA

Research suggests that strong relationships between students and teachers are at the core of creating a college-going culture.<sup>18</sup> Relatedly, EOS school leaders and educators told us that when adults whom students identified as someone they could trust reached out to students and personally invited them to enroll in advanced coursework, students were more likely to participate.

*“And what we were able to do was to reach out and go, here are those kids that are on the cusp or we may not have considered before and saying, ‘You can do this.’ And it’s pretty hard to resist a principal who’s been around for almost 10 years who says that to you. What ulterior motive do I have other than to see you succeed, approach a parent or a guardian and say, ‘Your kid can do this.’ And the trepidation falls away, and if you’ve built trust, they’ll go with you on that too.”*

—PRINCIPAL, CALIFORNIA

*“One thing I’ve learned since I’ve been in education: If you have a relationship with a student, they will want to work for you. They want to please you because they know that you care about them. And I think that’s been very important. Not just in our building, but as we just continue to grow children and prepare them.”*

—ASSISTANT PRINCIPAL, NORTH CAROLINA

*“And when you [amend the grading policy], it gives students hope, and it creates a relationship that’s committed to learning to the last day of the class, and that learning is what endures and allows students access to the next course. When you penalize students for being late or not turning in work or doing those types of things, it further disadvantages them and it disengages them.”*

—PRINCIPAL, CALIFORNIA

## A Sense of Belonging

Our findings confirm the importance of students feeling welcomed in AP courses and seeing themselves reflected in the students, curriculum, and pedagogy. Other research suggests that student perception, experience, and understanding of their identity (i.e., race, ethnicity, gender identity, socioeconomic status, etc.) shapes the experiences of students of color in STEM courses.<sup>19</sup> Therefore, it should come as no surprise that students opt out of STEM courses when their identities are erased from the curriculum and culture of the classroom and when they do not see themselves reflected in those leading the courses or leading STEM fields<sup>20</sup>.

EOS school leaders and principals spoke about the importance of fostering belonging and ensuring that racially diverse groups of students and their families felt welcome on school campuses, engaged in parent meetings, and worked alongside educators to close opportunity gaps. They also made clear that students need to feel safe and have a sense of belonging at school to take risks and flourish academically. Students also feel a sense of empowerment when they know that adults support them, set high expectations, and advocate for their success. EOS collects data from each student about whom they identify as a “trusted adult” who then engages in conversations with students to encourage them to take advanced courses.

*“We started doing outreach groups, and we found that outside of the White and Asian community, especially our Latino community, there was a very transactional relationship between parents and students, meaning they thought that they came to high school to get a good education, but they didn’t necessarily see themselves as part of the community. And so, we were trying to build a sense of belonging and identity on campus that was missing before.”*

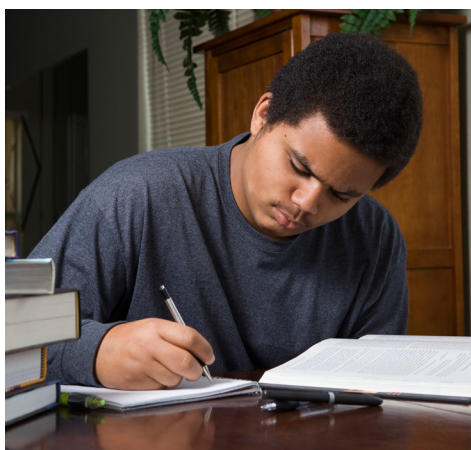
—PRINCIPAL, CALIFORNIA

*“Teachers were able to engage in some very meaningful conversations with kids. And the benefit of that went beyond just getting them into an AP class, which obviously is a great thing. But the longer-term benefit of that was making the kid or kids feel perhaps a little bit more connected to what was going on in the school environment, which just, as you know, is going to pay dividends regardless of what course they’re taking.”*

—PRINCIPAL, NORTH CAROLINA

*“That’s our job though, to constantly acknowledge or recognize students. And it doesn’t have to be for the best grade. We try to select a variety of students every month to acknowledge in some way so that they still persevere and keep with it and not get down and know that we notice. They’re proud of it. They love sharing it. And you just make all of these personal connections that go a long way.”*

—ASSISTANT PRINCIPAL, ILLINOIS



# THE CUES AND CONDITIONS OF STUDENT BELONGING

In their [recent report](#), Equal Opportunity Schools used survey data from over 90,000 students of color enrolled in one or more AP/IB class and extensive focus groups with 114 students to identify five leading indicators of belonging:

1

CULTURALLY RELEVANT CURRICULUM

2

CULTURALLY RELEVANT TEACHING

3

CLASSROOM COMMUNITY

4

EXPECTATIONS, FEEDBACK, AND ASSESSMENTS

5

CONVERSATIONS ABOUT RACE

To learn more about creating environments where students of color feel a sense of belonging, read the report here: <https://eoschools.org/approach/measuring-what-matters-belonging/>

### **Identity-Affirming Teaching and Educator Diversity**

Research also suggests the importance of culturally relevant teaching and learning when creating positive school climates. Having a same race teacher, for example, can have a positive effect on enrollment in advanced STEM courses. Studies find that teachers of color, in particular, are more likely to create a positive school climate that supports students of color in taking STEM courses by serving as a role model and reaching out to high-achieving students of color to encourage them to enroll in advanced courses.<sup>21</sup> Teachers of color also create identity-affirming environments by demonstrating a successful person of color who has mastered the content being taught and using culturally responsive teaching practices. This not only helps students of color to see themselves reflected in the classroom, but to also feel less of a burden of representing an entire group of students.<sup>22</sup> Several EOS school leaders spoke about the importance not just of ensuring students of color are enrolled in advanced courses, but of creating classrooms where all students feel safe and supported to engage deeply in learning. For example:

*“There are three things: One, a climate and culture of the room, where students need to feel safe and that they belong, and that is created by the instructor and the relationships built. Two is that the courses have to be structured in a way, whether it’s phenomenon-based or inquiry-based or student-centered, that supports engagement, student-centered learning, student dialogue, those types of things. And [number three is] listening and understanding students, creating an environment where they feel heard, where we engage in constructive dialogue when we have differences, and where they can see themselves either in what we’re teaching or how we’re teaching, or they can see themselves represented in the decisions that we’re making in the school. I think all that kind of adds up to that culture that allows them full access.”*

—PRINCIPAL, CALIFORNIA



# PART THREE

RECOMMENDATIONS

## FEDERAL:

Congress should support and incentivize states and districts to advance equity in access to and success in advanced coursework opportunities by:

- Encouraging states to incorporate detailed and disaggregated data around advanced coursework enrollment and success on their state report cards and requiring them to set goals for and create meaningful action plans for increasing access to and success in advanced coursework
- Increasing the Every Student Succeeds Act (ESSA) Title IV funding to allow more students of color and students from low-income backgrounds to access and receive credit for advanced courses
- Establishing a competitive grant program for states and school districts to increase enrollment opportunities and success of underrepresented students in advanced courses and programs
- Supporting and incentivizing states and districts to [recruit, retain, and support teachers and school leaders of color](#) through increased funding for historically Black colleges and universities (HBCUs), minority-serving institutions (MSIs), Hispanic-serving institutions (HSIs), and tribal colleges and universities (TCUs); increased funding for the Higher Education Act (HEA) Title II-Part A; and funding for the Augustus Hawkins Centers of Excellence Grant program to provide crucial funding to HBCUs and MSIs to provide increased and enhanced clinical experience and increased financial aid to prospective teachers of color, and improved HEA Title II data reporting requirements
- Supporting and incentivizing states and districts to prioritize [safe, equitable, and positive learning environments](#) through increased funding for whole child supports that will allow district and school leaders to hire adequate and well-trained support staff (restorative justice coordinators, school counselors, psychologists, nurses); provide professional development and coaching on topics such as reducing bias and anti-racist mindsets; provide curricular resources that are affirming of individual identities; engage and support families; and develop a positive school climate through alternatives to punitive and exclusionary discipline practices

The Department of Education should:

- Issue guidance and offer technical assistance to state and district leaders on strategies for equitably enrolling more students of color and students from low-income backgrounds in advanced coursework opportunities (e.g., open enrollment or automatic enrollment), including guidance for ensuring that undocumented students are not denied opportunities to participate in advanced courses
- Disseminate guidance on increasing the racial and linguistic diversity of the teacher workforce and reinstate a strengthened version of the guidance issued by the Departments of Education and Justice in 2014 related to the nondiscriminatory administration of school discipline
- Ensure that the Civil Rights Data Collection contains data elements pertaining to Advanced Placement course taking and exam success rates by race, ethnicity, English learners, disability status, and gender

**PROMISING PRACTICE FROM THE STATES:**

In March 2021, Illinois enacted [legislation that requires](#) students meeting or exceeding expectations on the state exam be automatically enrolled in the next most rigorous course offered in the school (dual enrollment, advanced placement, International Baccalaureate, honors or enrichment courses). The state allows families to opt out. Washington and North Carolina have similar laws.

**STATE:**

State leaders can [increase access to and success in advanced coursework](#) for Black and Latino students by:

- Enacting more equitable enrollment policies and practices, such as:
  - Requiring districts to use multiple measures to identify students for advanced coursework opportunities, including but not limited to expressed desire to enroll, exam scores, grades in relevant prerequisite courses, PSAT/SAT scores, and recommendations from trusted school staff
  - Passing automatic enrollment policies for all advanced coursework opportunities (K-12) so that students identified for advanced coursework through any of the measures above are automatically enrolled in advanced coursework opportunities, with the option to opt out
  - Monitoring progress of automatic enrollment to ensure schools are implementing the policy in ways that increase enrollment in advanced courses for historically underserved students
  - Providing technical support for schools and districts struggling to adequately enroll students of color and students from low-income backgrounds in advanced coursework opportunities, especially those opportunities that are the foundation for future success (e.g., Algebra I and II, Biology, Physics, Chemistry)
- Eliminating longstanding barriers to accessing advanced coursework opportunities by:
  - Covering the cost of exams, transportation, books, and other required materials for advanced coursework
  - Requiring districts and/or schools to notify families about advanced coursework opportunities available in the school and district, the benefits of enrolling in those courses, and the process around how to enroll, in the family's home language
  - Providing funding to recruit or train teachers to teach advanced courses, especially in schools serving large concentrations of students of color and students from low-income backgrounds
- Annually monitoring disaggregated data on enrollment in advanced courses, by course type, and providing technical assistance to districts who are under-enrolling students of color in advanced courses. This data should be publicly reported on report cards, so that communities have a better understanding of course availability, enrollment, and success in advanced courses
- Setting and holding themselves accountable for public goals that, within an ambitious number of years, Black and Latino students and students from low-income families will be fairly represented in access to and success in advanced coursework from elementary through high school



**FOR MORE ON HOW YOUR STATE IS PRIORITIZING STUDENTS' SOCIAL, EMOTIONAL, AND ACADEMIC DEVELOPMENT**, including providing access to a rigorous and culturally sustaining curriculum, see our 50-state web tool: [Is Your State Prioritizing SEAD?](#)

- Implementing policies to support district and school leaders in creating safe, equitable, and positive learning environments in advanced courses by:
  - Providing professional development and coaching for educators to create culturally affirming environments, build relationships with and understand their students, support students' academic success, and develop anti-racist mindsets
  - Investing in preparing, recruiting, and supporting teachers and counselors of color, given the research that shows educators of color are more likely to refer students of color for advanced courses
  - Requiring districts and schools to use culturally relevant, anti-racist pedagogy, practices, and curricula and provide technical assistance and funding for professional development
  - Supporting engagement with families and members of underserved communities by requiring districts to survey students and families to understand their interests, aspirations, and experiences with school, especially related to STEM
  - Creating guidance for schools about identifying and partnering with community-based organizations that provide rigorous after-school and/or summer enrichment opportunities that expose underserved students to STEM and STEM careers

**FOR MORE ON HOW YOUR STATE IS DIVERSIFYING THE TEACHER WORKFORCE**, see our 50-state web tool: [Is Your State Prioritizing Teacher Diversity?](#)

## DISTRICT/SCHOOL:

District and school leaders should:

- Enact more equitable enrollment policies and practices, such as:
  - Removing unnecessary prerequisites that use multiple measures to identify students for advanced coursework opportunities (e.g., expressed desire to enroll, exam scores, grades in relevant prerequisite courses, PSAT/SAT scores, and recommendations from trusted school staff)
  - Passing policies so K-12 students who are identified through any of those measures are automatically enrolled in advanced coursework, with the option to opt out after consulting a school counselor
    - This could include utilizing tools, like the EOS Student Insight Card, to ensure that multi-dimensional, equity-centered data that includes student voice is used to make decisions about academic opportunity and enrollment

- Make it as easy as possible for students to enroll in advanced courses by:
  - Sharing information with families in their home language about advanced coursework opportunities, the benefits of enrolling in these courses, and the process to enroll
  - Covering the cost of exams, transportation, books, and other required materials for advanced coursework
  - Creating a schedule that allows as many students as possible to enroll and ensuring high school students can review their schedule with a school counselor
- Set clear, ambitious goals for improving access to and success in advanced coursework and measure and publicly report district and school progress toward those goals, including by requiring school leaders to complete bi-annual reviews of advanced coursework enrollment data to ensure each course (e.g., AP Biology) is representative of the overall student body. Surveying students, families, and school staff can also be helpful for identifying promising practices and areas for improvement
- Create safe, equitable, and positive learning environments in advanced courses by:
  - Ensuring schools have an adequate number of school counselors who can identify courses that are rigorous and challenging to meet the interests and aspirations of all students, and enlist other staff as [“trusted adults”](#) who can also encourage students to take advanced courses
  - Providing professional development to educators and administrators about proactively identifying Black and Latino students for advanced courses, connecting the coursework to their career interests and aspirations, and helping them succeed in advanced courses
  - Providing professional development to educators and administrators about culturally relevant instructional practices, such as creating opportunities to draw on and incorporate students’ cultural backgrounds and [lived experiences](#) in STEM classes, and a culturally relevant curriculum that represents people of color in STEM careers and shows communities of color using STEM as a tool for dismantling white supremacy
  - Investing in preparing, recruiting, and supporting teachers and counselors of color, given the research that shows educators of color are more likely to refer students of color for advanced courses
  - Using reliable climate and voice surveys, such as these free surveys available from the [National Center on Safe Supportive Learning Environments](#) to determine areas of improvement
- Provide support for students who may need additional time to build skills for advanced placement courses, such as expanded learning time programs ([summer school, after-school, winter session or targeted intensive tutoring](#))

**FOR MORE ON CREATING POSITIVE AND EQUITABLE LEARNING ENVIRONMENTS FOR STUDENTS OF COLOR**, see our report: [Social, Emotional, and Academic Development Through an Equity Lens](#) .

# TECHNICAL APPENDIX

In this investigation, we employed a mono-method design and quantitative survey and administrative data collected by Equal Opportunity of Schools (EOS) to respond to the investigation's principle research questions. Below, we provide details of our analytic approach for disclosure, review, and replication. As a note, all quantitative data were analyzed using R and a suite of libraries, most notably 'tidyverse', 'reshape2', and 'lme4'. Qualitative data resulting from interviews were analyzed using an iterative qualitative coding process that moved from codes to categories and categories to themes.

## PART ONE OF OUR ANALYSIS

### DATA MANAGEMENT PROCESS

In response to our principle research question, we used three core data files to produce the results detailed above—those being a student survey, course enrollment data for AP classes, and school enrollment data. All data files for this investigation were collected in AY 2019-2020. Together, these de-identified data files contain information on students' postsecondary aspirations (i.e., highest education goal), their favorite subject areas (e.g., math, computer science, science, etc.), their demographic characteristics (e.g., race, free/reduced price lunch status (as a proxy for socioeconomic status), a school-level count of students enrolled in AP Biology, AP Chemistry, and AP Physics 1: Algebra based (by race and FRL status), and enrollment counts. To create our analytic file, we employed a multi-step procedure:

First, using the student survey data, we created a dichotomous indicator (0-No;1-Yes) to capture those students who were both aspiring to matriculate at college and who named STEM courses as their favorites. Thereafter, we reduced our sample to only those students who were 1) college aspiring and STEM interested and who 2) self-identified as Black, Latino, or a student from a low-income background. Then, we grouped the resultant data by school district and summed the total number of students (by demographic characteristics) that were college aspiring and STEM interested. This resulted in a count of Black and Latino students and students from low-income backgrounds who, by district, were college aspiring and STEM interested. As a note, EOS does not partner with all schools in each of their partner districts or every district in the country. As such, the counts and resulting findings should not be misinterpreted to mean all students in the country but rather students in partnering Equal Opportunity School's districts and schools.

Second, we filtered the course enrollment data file by 1) race and demographic characteristics (i.e., Black and Latino students, and students from low-income backgrounds), 2) by course name (e.g., AP Biology, etc.), and 3) by school year (i.e., AY 2019-2020). This resulted in separate analytic files by race and demographic characteristics. We then took these files and grouped the data by district, as was done in the preceding step, and summed the total number of students enrolled in AP Biology.

Third, we filtered the school enrollment data and only used data from AY 2019-2020 to ensure data across the three data files were uniform in temporal focus. As was done with earlier files, we grouped the data in the school enrollment data file by district.

Fourth, we used merging techniques (i.e., `inner_join` by `district_id`) to create the final analytic file. The final analytic file contains the following key variables of interest: course name, district ID number, course enrollment count, count of college-aspiring and STEM-interested students (by race/demographic characteristics), and the total number of enrolled students (by race/demographic characteristics), as well as district name and state. The final file contains data from 24 states: AR, CA, CO, CT, FL, IA, IL, KY, MA, MD, MI, MN, MO, NC, NJ, NY, OH, OR, SC, TX, UT, VA, WA, and WI.

## DATA ANALYSIS PROCESS

To analyze the data, we calculated two percentages for each district, those being: 1) the percentage of college-aspiring and STEM-interested Black and Latino students and students from low-income backgrounds and 2) the percentage of Black and Latino students and students from low-income backgrounds that are enrolled in AP Biology, AP Chemistry, and AP Physics 1: Algebra based.

## PART TWO OF OUR ANALYSIS

### DATA MANAGEMENT PROCESS

To respond to our principle research question, we used data from a student survey and school enrollment data. We first created an analytic file that contained information of interest: a dichotomous indicator of whether a student has taken any AP course (0-No; 1-Yes), a student's reported highest educational goal (i.e., postsecondary aspirations), dummy codes for race (with White and Black students as alternating reference groups), a dichotomous indicator of a student's status for free/reduced priced lunch (0-No;1-Yes), a dummy variable for gender (0-male;1-female), whether students perceive their classes as preparing them for college (1-definitely not; 3- unsure; 5- definitely yes), whether staff provide adequate information about AP courses, whether students feel as though students like them are welcome in AP classes, school size, the proportion of underrepresented students at the school, and the proportion of students who qualify for free/reduced priced lunch.

### DATA ANALYSIS PROCESS

Considering the presence of nested units within the data (students within schools), we constructed a multilevel generalized logistic regression model for a dichotomous outcome to assess the relationship between a student's postsecondary aspirations and the likelihood they take an AP course. Our model was comprised of two levels (e.g., Level 1- students; Level 2- schools), which allowed us to assess the extent to which the relationships between our key predictors and our outcome of interest vary within and across schools. Our analytic procedure consisted of the following multi-stage/-model process.

We began by specifying an unconditional means model where our intercept varied across clusters and took the following form:  $APENROLL_{ij} = \bar{Y}_{00} + U_{0j}$ , where  $\bar{Y}_{00}$  represents the average value for our outcome across clusters and  $U_{0j}$  is a group specific effect that varies from cluster to cluster. We used the results of this initial model to calculate the Intraclass Correlation Coefficient (ICC) and found that a sizable proportion of the variation (49%) in our outcome of interest was accounted for by higher level clusters. We then proceeded to add in key Level 1 and Level 2 predictors to the model as fixed effects and allowed the intercept to vary across clusters. In our final model, we add within and cross-level interaction terms. Of note, key predictor variables were group mean centered to ease interpretation, those being: college aspiring, courses preparing students for college, adequate information on how to enroll in AP classes, and belonging in AP classes.

We were particularly interested in the enhancing or inhibitory effects of predictors situated at Level 2 (namely, school size, proportion of URM students at a school, and proportion of FRL students at a school) on key Level 1 variables, namely whether students feel their courses are preparing them for college, whether they receive adequate information about AP courses, and whether they feel as though students like them belong in AP classes. We model these as cross-level interactions and hypothesize that as each of the Level 2 indicators increases, the relationship between the aforementioned key Level 1 predictors and our outcome of interest will weaken and point to larger systemic issues within schools. Our final model takes the following structure:

**LEVEL 1:**

$$APENROLL_{ij} = \beta_{0j} + \beta_{1j} \text{Aspirations}_j + \beta_{2j} \text{Gender}_j + \beta_{3j} \text{Latinx}_j + \beta_{4j} \text{API}_j + \beta_{5j} \text{White}_j + \beta_{6j} \text{FRL}_j + \beta_{7j} \text{CPrep}_j + \beta_{8j} \text{Adequate}_j + \beta_{9j} \text{Belonging}_j + \beta_{10j} \text{SSize}_j + \beta_{11j} \text{PURM}_j + \beta_{12j} \text{PFRL}_j$$

**Level 2:**

$$\beta_{0j} = \gamma_{00} + U_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Adequate}) + \gamma_{12}(\text{Belonging}) + \gamma_{12}(\text{CPrep})$$

$$\beta_{2j} = \gamma_{20}$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}(\text{Belonging})$$

$$\beta_{4j} = \gamma_{40} + \gamma_{41}(\text{Belonging})$$

$$\beta_{5j} = \gamma_{50} + \gamma_{51}(\text{Belonging})$$

$$\beta_{6j} = \gamma_{60} + \gamma_{61}(\text{Belonging})$$

$$\beta_{7j} = \gamma_{70} + \gamma_{71}(\text{SSize}) + \gamma_{72}(\text{PURM}) + \gamma_{73}(\text{PFRL})$$

$$\beta_{8j} = \gamma_{80} + \gamma_{81}(\text{SSize}) + \gamma_{82}(\text{PURM}) + \gamma_{83}(\text{PFRL})$$

$$\beta_{9j} = \gamma_{90} + \gamma_{91}(\text{SSize}) + \gamma_{92}(\text{PURM}) + \gamma_{93}(\text{PFRL})$$

$$\beta_{10j} = \gamma_{10}$$

$$\beta_{11j} = \gamma_{11}$$

$$\beta_{12j} = \gamma_{12}$$

**Table 1** below presents a breakdown of our final analytic sample whereas **Table 2** presents the results of our final model.

**TABLE 1: SAMPLE CHARACTERISTICS**

VARIABLES	DESCRIPTIVE STATISTICS AND FREQUENCIES <sup>1</sup>
<b>Outcome Variable</b>	
<b>TOOK AN AP CLASS</b>	<b>103,490 (50%)</b>
<b>School (or, Level 2) Indicators</b>	
% Minority Students at School	39 (23)
School Size	2,003 (682)
% Low Income Students at School	37 (19)
<b>Key Independent Variables</b>	
College Aspirations	0.90 (0.30)
Preparation for College	3.44 (1.07)
Know how to Enroll in AP Class	3.96 (1.42)
<b>BELONGING IN AP CLASS</b>	<b>4.54 (1.31)</b>
<b>Background Characteristics</b>	
Girls	104,428 (51%)
Pacific Islander	2,394 (1.2%)
Gender Non-Conforming	23 (<0.1%)
Black or African American	25,711 (13%)
Latino/a	49,898 (24%)
Asian (not Pacific Islander)	26,756 (13%)
White	92,507 (45%)
Student from Low SES Backg.	67,112 (33%)
Other	7,065 (3.4%)
American Indian or Alaskan Native	836 (0.4%)
<sup>1</sup> Mean (SD); n (%)	
Total Sample Size: 205,167	
Schools: 184	

**TABLE 2: RANDOM INTERCEPT MULTILEVEL MODEL WITH CROSS-LEVEL INTERACTIONS**

Variables	OR <sup>1</sup>	SE
(Intercept)	0.6968*	0.127
College Aspirations	<b>2.0569***</b>	0.039
Girls	1.2073***	0.012
Latino/a	0.8718***	0.013
PI	1.0745	0.051
Asian	1.8640***	0.033
Black or African American	0.7972***	0.014
AI	0.9270	0.072
Other	1.0193	0.028
Low Income	0.7330***	0.009
Preparation for College (Centered)	0.9469**	0.017
Know how to Enroll in AP Class (Centered)	1.4379***	0.021
Belonging in AP Class (Centered)	1.4581***	0.025
School Size	1.0001	0.000
% Minority Students at School	1.0011	0.003
% Low Income Students at School	0.9998	0.004
College Aspirations * Know how to Enroll in AP Class (Centered)	<b>1.1644***</b>	0.016
College Aspirations * Belonging in AP Class (Centered)	<b>1.1198***</b>	0.016
College Aspirations * Preparation for College (Centered)	1.0321*	0.016
Latino/a * Belonging in AP Class (Centered)	0.961***	0.011
PI * Belonging in AP Class (Centered)	0.967	0.039
Asian * Belonging in AP Class (Centered)	1.0111	0.014
Black or African American * Belonging in AP Class (Centered)	0.8241***	0.011
Other * Belonging in AP Class (Centered)	0.9470*	0.022

Variables	OR <sup>1</sup>	SE
AI * Belonging in AP Class (Centered)	0.9283	0.056
Preparation for College (Centered) * School Size	1.0000***	0.000
Preparation for College (Centered) * % Minority Students at School	0.999*	0.000
Preparation for College (Centered) * % Low Income Students at School	1.0006	0.000
Belonging in AP Class (Centered) * School Size	1.0000	0.000
Belonging in AP Class (Centered) * % Minority Students at School	0.9997	0.000
Belonging in AP Class (Centered) * % Low Income Students at School	1.0005	0.000
Know how to Enroll in AP Class (Centered) * School Size	1.0000**	0.000
Know how to Enroll in AP Class (Centered) * % Minority Students at School	0.999***	0.000
Know how to Enroll in AP Class (Centered) * % Low Income Students at School	0.999*	0.000
Sigma	1.00	
Log-likelihood	-121,568	
AIC	243,207	
BIC	243,576	
Deviance	242,243	
Residual df	205,131	

<sup>1</sup>\*p<0.05; \*\*p<0.01; \*\*\*p<0.001

<sup>2</sup> **Outcome Variable:** Took an AP Class (Yes=1, No=0)

<sup>3</sup> **Racial Reference Group:** White Students

<sup>4</sup> **Gender Reference Group:** Boys

<sup>5</sup> **Within Level Interactions (i.e., L1\*L1):** Race/Ethnicity\*Belonging; CollegeAspirations\*Know How to Enroll; CollegeAspirations\*Belonging; CollegeAspirations\*Preparation

<sup>6</sup> **Cross-Level Interactions (i.e., L1\*L2):** Preparation/Belonging/Enroll\*%Minority; Preparation/Belonging/Enroll\*%LowIncome; Preparation/Belonging/Enroll\*School Size





## ENDNOTES

1. Park, A., & Ducharme, J. (2021, December 13) "2021 Heroes of the Year: The Miracle Workers." *TIME*. <https://time.com/heroes-of-the-year-2021-vaccine-scientists/>
2. Hansen, S. (2021, June 10). "Her Science is the World's." *UMBC Magazine*. <https://magazine.umbc.edu/her-science-is-the-worlds/>
3. Subbaraman, N. (2021, February 11). "This COVID-vaccine Designer is Tackling Vaccine Hesitancy – in Churches and on Twitter." *Nature*. <https://www.nature.com/articles/d41586-021-00338-y>
4. Patrick, K., Socol, A., & Morgan, I. (2020). *Inequities in Advanced Coursework*. The Education Trust. <https://edtrust.org/resource/inequities-in-advanced-coursework/>
5. Theokas, C. (2013). *Finding America's Missing AP and IB Students*. The Education Trust. <https://edtrust.org/resource/finding-americas-missing-ap-and-ib-students/>
6. Patrick, Socol, & Morgan. *Inequities in Advanced Coursework*. The Education Trust.
7. Fry, R., Kennedy, B., & Funk, C. (2021, April 1). *STEM Jobs See Uneven Progress in Increasing Gender, Racial, and Ethnic Diversity*. Pew Research Center. <https://www.pewresearch.org/science/2021/04/01/stem-jobs-see-uneven-progress-in-increasing-gender-racial-and-ethnic-diversity/>
8. Dixon-Fyle, S., Dolan, K., Hunt, V., & Prince, S. (2020). *Diversity Wins: How Inclusion Matters*. McKinsey & Company. <https://www.mckinsey.com/featured-insights/diversity-and-inclusion/diversity-wins-how-inclusion-matters>
9. Garibay, J. (2015). "STEM students' social agency and views on working for social change: Are STEM disciplines developing socially and civically responsible students?" *Journal of Research in Science Teaching*, 52(5), 610-632.
10. McGee, E., & Bentley, L. (2017). "The Equity Ethic: Black and Latinx college students reengineering their STEM careers toward justice." *American Journal of Education*, 124(1), 1-36.
11. Weller, C., & Roberts, L. (2021). *Eliminating the Black-White Wealth Gap is a Generational Challenge*. Center for American Progress. <https://www.americanprogress.org/article/eliminating-black-white-wealth-gap-generational-challenge/>
12. Burt, B., & Johnson, J. (2018). "Origins of STEM interest for Black male graduate students in engineering." *School Science and Mathematics*, 118(6), 257-270.
13. Warne R., Sonnert, G., Sadler, P. "The Relationship Between Advanced Placement Mathematics Courses and Students' STEM Career Interest." *Educational Researcher*, 48(2): 101-111. Hutchinson-Anderson, K., Johnson, K., & Craig, P. A. (2015). Research and teaching: Students' perceptions of factors influencing their desire to major or not major in science. *Journal of College Science Teaching*, 45(2), 78–85.
14. Morgan, I., & Amerikaner, A. (2018). *Funding Gaps 2018*. The Education Trust. <https://edtrust.org/resource/funding-gaps-2018/>
15. Crabtree L., Richardson, S., Lewis, C. (2019) "The Gifted Gap, STEM Education, and Economic Immobility." *Journal of Advanced Academics*, 30(2):203-231.

16. For previous reports from The Education Trust on access to advanced coursework opportunity for students of color, see <https://edtrust.org/shattering-expectations-at-the-high-end-of-achievement/>
17. Duchesneau, N. (2020). *Social, Emotional, and Academic Development Through an Equity Lens*. The Education Trust. <https://edtrust.org/social-emotional-and-academic-development-through-an-equity-lens/>
18. Knight-Manuel, M., Marciano, J., Wilson, M., Jackson, I., Vernikoff, L., Zuckerman, K., & Watson, V. (2019). "It's All Possible: Urban Educators' Perspectives on Creating a Culturally Relevant, Schoolwide, College-Going Culture for Black and Latino Male Students." *Urban Education*, 54(1), 35–64. McKillip, M., Godfrey, K., & Rawls, A. (2013). "Rules of Engagement: Building a College-Going Culture in an Urban School." *Urban Education*, 48(4), 529–556.
19. Ortiz, N., Morton, T., Miles, M., & Roby, R. (2019). "What About Us? Exploring the Challenges and Sources of Support Influencing Black Students' STEM Identity Development in Postsecondary Education." *The Journal of Negro Education*, 88(3), 311–326.
20. Burt & Johnson, 2018, *Origins of STEM Science for Black Male Graduate Students*.
21. Hart, C. An Honors Teacher Like Me: Effects of Access to Same-Race Teachers on Black Students' Advanced-Track Enrollment and Performance. (2020) *Educational Evaluation and Policy Analysis*, 42(2): 163-187.
22. Hart, 2020, Teacher Like Me.



**The Education Trust**

## **ABOUT THE EDUCATION TRUST**

The Education Trust is a national nonprofit that works to close opportunity gaps that disproportionately affect students of color and students from low-income families. Through our research and advocacy, Ed Trust supports efforts that expand excellence and equity in education from preschool through college; increase college access and completion, particularly for historically underserved students; engage diverse communities dedicated to education equity; and increase political and public will to act on equity issues.

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**EQUAL**  
OPPORTUNITY  
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## **ABOUT EQUAL OPPORTUNITY SCHOOLS**

Equal Opportunity Schools is a national organization serving school districts of all sizes. We are here to help better serve students of color and low-income students and improve the accessibility of advanced learning classes. We provide tools such as a gaps chart analysis, equity pathways reports, beginning and end-of-year student/administrator surveys, best practices from more than 700 schools in 220+ districts across 33 states, and support to make equity and improved access to rigorous courses a district priority.

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