COLLEGE AND CAREER PATHWAYS: EQUITY AND ACCESS

ExcelinEd Civil Rights Data Collection Analysis- 2018

By 2020, 65 percent of jobs will require a postsecondary credential, meaning anything from a bachelor's degree to industry-recognized credentials. Without access to essential math and science classes in high school, many students will graduate from high school unprepared for postsecondary learning and the opportunities it offers. *To ensure students have opportunities to acquire a postsecondary credential, we need to know what courses are available to them during high school.*

EXECUTIVE SUMMARY

Analysis Findings

Excel*in*Ed's new analysis of data from the U.S. Department of Education reveals that too many students in every state do not have the chance to take fundamental courses needed to prepare them for college and career.

- Nationally, millions of students lack access to key courses that would prepare them for college and career.
- Access is inequitable: it is worse for schools with high populations of minority students and schools with high populations of low-income students.

Solutions for States

If states know which math, science and advanced learning opportunities students have access to, they can better understand how that access (or lack thereof) may impact students' futures as well as the future of local, state and national workforces and economies. Excel*in*Ed has identified a three-step process states can consider using to overcome gaps in access to core courses.

1. **Evaluate**: Conduct a statewide audit of course offerings and access.
2. **Communicate**: Inform families of courses necessary for college and career readiness and options to access those courses.
3. **Improve**: Identify policy solutions to improve access for students.

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About the Data Source

Since 1968, the U.S. Department of Education's Civil Rights Data Collection (CRDC) has collected data on key education and civil rights issues in our nation's public schools. CRDC offers a variety of information including student enrollment and educational programs and services, which the Department of Education's Office for Civil Rights (OCR) collects and publishes the biennial data collection.

In April 2018, OCR released the 2015-16 CRDC. The information in this data collection is self-reported by 17,300 public school districts and 96,400 public schools and educational programs (a 99.8 percent response rate). The data include access to math (Algebra I, Geometry, Algebra II, Advanced Math and Calculus), science (Biology, Chemistry and Physics) and college-credit bearing courses (Advanced Placement and dual enrollment).

Part 1: The Analysis

CRDC[1] is the most comprehensive 50-state data source on access to college and career preparation courses currently available. Excel*in*Ed analyzed the 2015-16 CRDC to identify gaps in students' access to college and career preparation courses. Through this analysis, we strove to answer the following questions:

- How many students do not have access to college and career preparation courses[2] in their schools?
- What types of schools are more or less likely to offer those courses?
- Do schools with higher populations of minority and low-income students offer students equal access to college and career preparation courses?

Our Approach

Our approach to the data analysis includes:

- Linking CRDC with the Common Core of Data (CCD)[3] to provide additional and more accurate information about school characteristics, particularly school enrollments.[4]
- Using a broad definition of "high school" (schools offering grades 9, 10, 11 or 12) that gives better insight into schools that should be offering these courses.
- Choosing to use course "or higher" in analysis. Only identifying how many schools do not offer a specific course could be misleading, especially in math and science where there is typically a traditional course progression.

Visit ExcelinEd.org/CRDC-Analysis to access our dataset and additional resources.

Data Limitations

While CRDC is the most comprehensive dataset on access to college and career preparation courses, it has some limitations. CRDC and our analysis does not: include if students are accessing courses online, include non-core courses, reflect the current school year (2017-18) or reflect the quality of the course. Additionally, we did not independently verify the information from the 29,716 public schools reflected in this analysis. For more information, see Appendix A on page 14.

Analysis Definitions

All Schools — CRDC collects data from K-12 public local education agencies (LEA) and schools, including juvenile justice facilities, charter schools, alternative schools and schools serving only students with disabilities. We have limited that population to all public schools offering grades 9, 10, 11 or 12.

Locale — The National Center for Education Statistics (NCES) designed a locale framework to provide a general indicator of the type of geographic area where a school is located. We used NCES's four basic types of locale (city, suburban, town and rural) and did not include subtypes. Additional details can be found at the NCES website.

Poverty — We identified low-income students as those eligible for free or reduced-price lunch (FRPL) under the National School Lunch program. We sorted K-12 schools from smallest to greatest percentage of FRPL students, separated out high schools and divided the high schools into quintiles which we reference throughout the report.

Minority — We identified Black, Hispanic, American Indian and Pacific Islander students as minority students. We sorted K-12 schools from smallest to greatest percentage of minority students, separated out high schools and divided high schools into quintiles which we reference throughout the report.

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[1] U.S. Department of Education, Office for Civil Rights, 2015-16 Civil Rights Data Collection. Available at www2.ed.gov/about/offices/list/ocr/docs/crdc-2015-16.html.
[2] Core courses collected by the CRDC are: Algebra I, Geometry, Algebra II, Advanced Math and Calculus; Biology, Chemistry and Physics; Advanced Placement and dual enrollment.
[3] U.S. Department of Education, National Center for Education Statistics, Common Core of Data. Available at https://nces.ed.gov/ccd/.
[4] CRDC allows users to look at the data in two ways: by number of schools and percent of schools. ExcelinEd used the Common Core of Data (CCD) to match NCES ID numbers, allowing us to also analyze the number of students affected by the lack of access in those schools. This is important to get a better indication of how many students are affected, as school sizes vary widely across the US.

PART 2: OUR FINDINGS

Excel*in*Ed's analysis identifies a national issue for high school-aged students: lack of access to critical courses necessary to prepare for college and career. We found the following:

- Nationally, millions of students lack access to key courses that would prepare them for college and career.
- Access is inequitable: it is worse for schools with high populations of minority students[5] and schools with high populations of low-income students.[6]

Students Lack Access to College and Career Preparation Courses

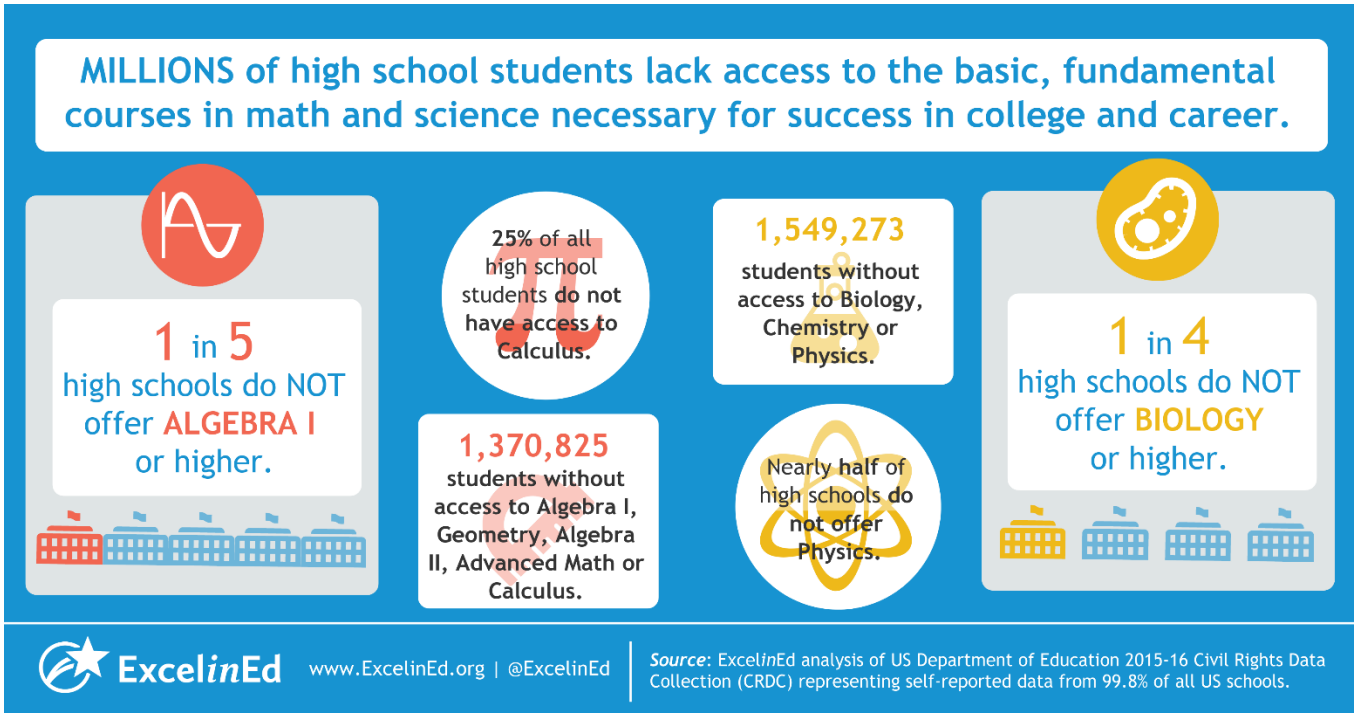
The data show that across the country, nearly 1.4 million students attend public high schools that do not offer Algebra I or the subsequent progression of math courses expected by many colleges and universities for enrollment.

An even greater number—1.5 million students—attend public high schools that do not offer Biology or higher. And those are just the first core courses in the math and science progressions.

More than half of our nation's high schools don't offer Calculus, meaning 4.3 million students can't pursue this course. Nearly half (47 percent) of high schools don't offer Physics, leaving 3.4 million students without access.

The problem is not isolated to just a few states. According to the self-reported data in the CRDC, ***not a single state offers Algebra I or Biology in all high schools***. For additional information about the limitations of this data set, see the data limitations on p. 2.

These courses open the door for students to pursue a range of challenging and vital careers. Research shows that students who take high-quality math in high school are more likely to declare STEM majors in college. And students



[5] *ExcelinEd defines high minority schools as schools in the 80th percentile or higher of minority students enrolled in those schools and low minority schools as those schools in the 20th percentile or lower.*

6 ExcelinEd defines high poverty schools as schools in the 80th percentile or higher of FRPL students enrolled in those schools and low poverty schools as those schools in the 20th percentile or lower.

who take Algebra II in high school are also more likely to enroll in college or community college. Many colleges expect students to have mastered these topics before they are accepted. Yet millions of students have no access.

Lack of Access Reveals Equity Issues

Even considering the limitations of the data, Excel*in*Ed's analysis revealed an alarming and consistent pattern of inequity. As noted, students attending two specific types of schools are significantly less likely to have access to college and career preparatory courses: **high minority schools and high poverty schools.**

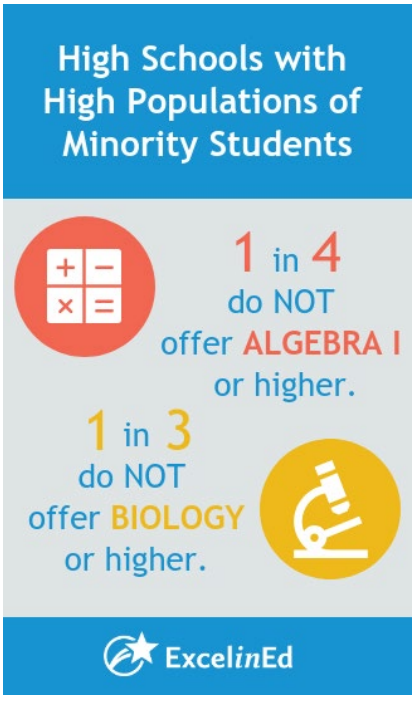
Equity Issue 1: High Minority Schools

Our analysis showed that students in high schools serving high populations of minority students are significantly less likely to have access to courses needed to prepare them for college and career. ***The data consistently reveal that as the percentage of minority populations in schools increases, access to courses decreases***.

Twenty-five percent of schools serving high populations of minority students—one in four schools—do not offer Algebra I or higher, compared to the U.S. average of 20 percent.

Twenty-nine percent of schools serving high populations of minority students—one in three schools—don't offer Biology or higher, compared to the U.S. average of 23 percent. But consider that only 14 percent of schools in the 20th percentile or lower in the percent of minority students enrolled has this issue, and the breadth of the inequity becomes clear.

See Appendix B on page 16 for more on how access differs based on a school's minority population.



Many High Minority Schools Don't Offer Core Courses
Lack of Access Increases as Courses Become More Advanced

	High Minority High Schools Without Access	Low Minority High Schools Without Access	All High Schools Without Access
MATH			
Algebra I or Higher	25%	12%	20%
Calculus	70%	40%	55%
SCIENCE			
Biology or Higher	29%	14%	23%
Physics	59%	31%	47%
ACCELERATION			
Advanced Placement	62%	48%	55%
Dual Enrollment	69%	33%	52%

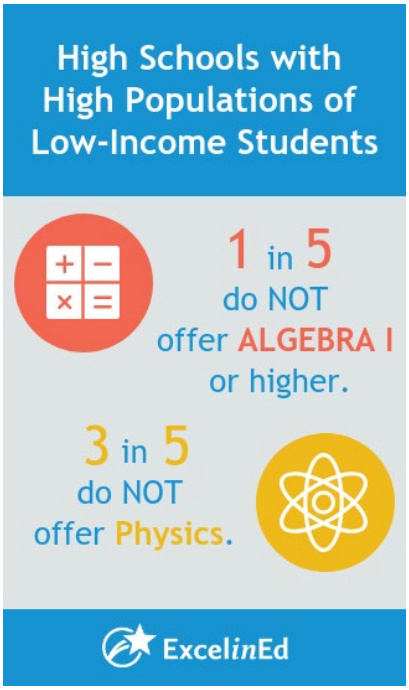
Equity Issue 2: High Poverty Schools

Students in high poverty high schools—schools serving high populations of low-income students—are also significantly less likely to have access to courses needed to prepare students for college and career. ***The data consistently reveal that as the percentage of low-income populations in schools increases, access to courses decreases.***

Twenty-one percent of high poverty schools, or one in five, do not offer Algebra I or higher.

Sixty percent of high poverty schools, or three in five, don't offer Physics or higher, compared to the U.S. average of 47 percent. In contrast, only 33 percent of low-poverty schools fail to offer Physics.

See Appendix C on page 18 for more on how access differs based on income.



Many High Poverty Schools Don't Offer Core Courses
Lack of Access Increases as Courses Become More Advanced

	High Poverty High Schools Without Access	Low Poverty High Schools Without Access	All High Schools Without Access
MATH			
Algebra I or Higher	21%	16%	20%
Calculus	72%	39%	55%
SCIENCE			
Biology or Higher	25%	18%	23%
Physics	60%	33%	47%
ACCELERATION			
Advanced Placement	65%	41%	55%
Dual Enrollment	65%	44%	52%

Locale & School Size

Lack of access isn't just a rural problem. We had assumed lack of access nationally would be much higher in rural schools compared to city, suburb or town schools. However, the data showed that city schools are more likely not to offer math courses within their schools compared to rural schools.

School size matters. Small are less likely to offer the full progression of math and science courses. *Very small* schools—those with fewer than 93 students—are significantly less likely to offer college and career preparatory courses than larger schools, regardless of location. According to the CCD, 18 percent of K-12 students attend schools serving 100 or fewer students.

See page 9 for more on rural and small school findings.

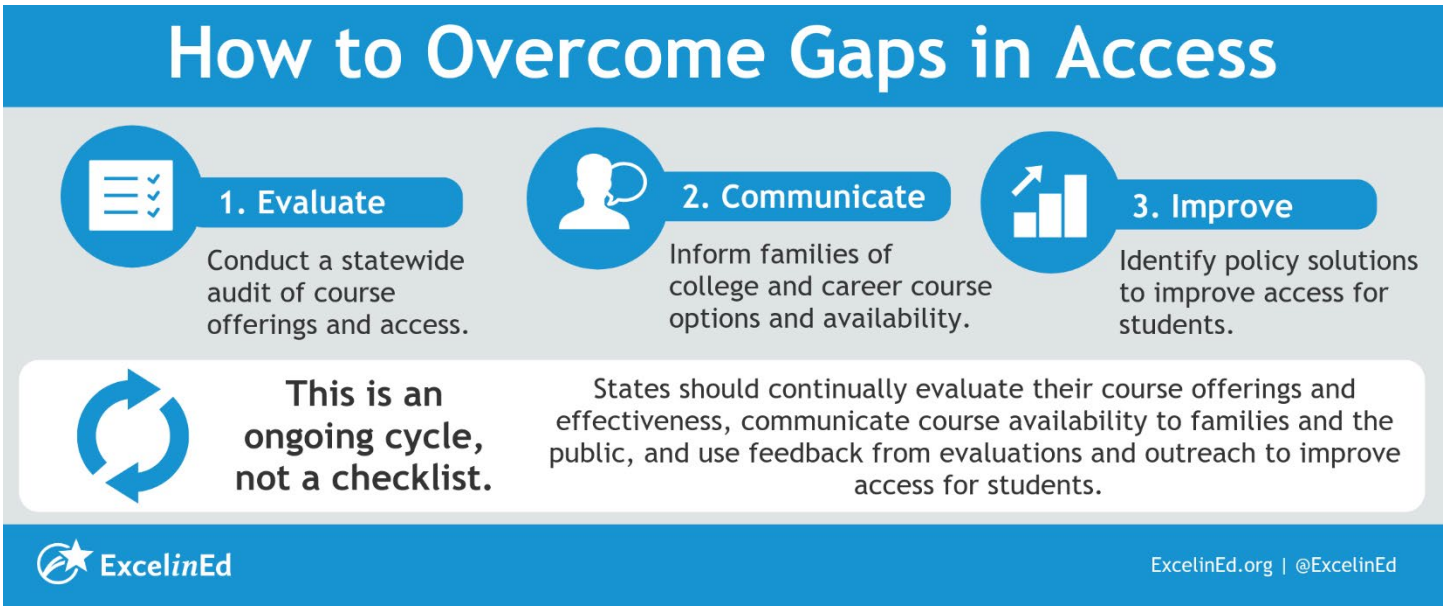
PART 3: SOLUTIONS FOR STATES

At Excel*in*Ed, we promote student-centered policy solutions that increase student learning, advance equity and prepare graduates for college and career. These solutions can help ***all*** students access the courses necessary to reach their greatest potential. And we see a path forward for states seeking to address this crisis in access *and* equity.

Excel*in*Ed has identified a three-step process states can consider using to overcome gaps in course access:

1. **Evaluate**: Conduct a statewide audit of course offerings and access.
2. **Communicate**: Inform families of courses necessary for college and career readiness and options to access those courses.
3. **Improve**: Identify policy solutions to improve access for students.

This process should be viewed as an ongoing cycle, rather than a check list. States should *continually* evaluate their course offerings and effectiveness, *continually* communicate course availability to families and the public, and *continually* use feedback from evaluations and communications efforts to improve access for students.



Step 1: Evaluate

First, states should consider conducting a statewide audit of course offerings and access. This is the only way to capture accurate, up-to-date and complete information on existing gaps in course offerings.

CRDC is the best 50-state data source on access to college and career preparation courses currently available. However, the data collected by the U.S. Department of Education may not reflect the full breadth of course types (e.g., industry-aligned) or modalities (e.g., online) that the state is interested in encouraging students to pursue. Consequently, core course data from the CRDC should just be a starting point. States should conduct their own audits to identify *all* course availability and the full extent of course gaps in students' education.

Course Availability Audit: Sample Questions

All Courses

- Which courses and opportunities should students have access to prepare them for college and career?
- How widely available are math, science and college preparation courses to students in your state's high schools?
- Are there disparities in which schools have more or less access to the courses? If so, what disparities exist?
- Are there areas within the state that have more or less access to the courses? If so, where?
- Are the missing courses necessary for the student to graduate high school? To enter the public university system? To earn an industry certification?

Career and Technical Education Programs

- How widely available are industry-aligned, high-quality programs of study to students in your state high schools (including student demographic analysis)?
- Which programs of study (regardless of quality) are most accessible to students (including student demographic analysis)?

Step 2: Communicate

One outcome of a state's audit and the subsequent analysis should be a clear understanding of which types of courses are critical for postsecondary success and career readiness and where gaps in access to those courses exist. Even as states work to correct inequity and gaps in access within the state, they must communicate the results of the analysis to parents and students.

Parents and students should be informed of and able to easily find the following:

1. Range of college and career readiness courses students should consider and take.
2. Options to access those courses.

Why Parents Need to Know

In many states, students are not just limited to their residentially assigned school. Families can employ public school choice, which includes non-traditional schooling options like open enrollment public schools, public charter schools, magnet schools and online learning.

Course availability varies by school, especially for higher level math, science and college preparation courses. Informed parents and students can make better choices for future college and career success.

Step 3: Improve

Finally, states can identify policy solutions to improve access for students. There isn't one solution to address access gaps nationwide. States need to customize their plans for addressing state access gaps based on their own analysis and unique state circumstances. However, we have compiled the following potential options for consideration.

Expand Course Offerings Statewide Through Course Access

State leaders can look to states employing course access policies like Louisiana, Indiana and Rhode Island. Course access is a state-level program that provides students with expanded course offerings from diverse, accountable providers across the country. Students then can receive credit in their home school for these courses. Strong data

collection and reporting from the analysis can help states make informed decisions on what types of courses to include in their program and where those courses would have the greatest impact. States can also consider providing a course access opportunity incentive to encourage district utilization of courses not available through the student's home school. Learn more about course access.

Expand Options Offered by Existing Course Providers

States can allow their districts and schools to utilize other online resources and courses as they address access gaps. High-quality online learning is an effective way to offer courses to students across state and district lines. Organizations such as Modern States Education Alliance partners with edX to "let students earn up to one year of college credit without tuition or textbook expense." Khan Academy is widely used by schools across the U.S. and "offers practice exercises, instructional videos and a personalized learning dashboard that empower[s] learners to study at their own pace in and outside of the classroom."

Expand Access to High-Quality Career and Technical Education (CTE) Pathways

After a state analysis of core and non-core courses, states should be able to report on what CTE opportunities are available to which students. However, this is the first step. States can also analyze regional labor market data to determine whether offerings available to students are closely aligned both to industry standards and demand. High-quality pathways have the following features: include the progressive set of coursework, experiences and credentials that span both secondary and postsecondary education as well as work-based contexts; are closely aligned with industry standards and demand; and prepare learners not only for entry to a middle- or higher-wage job, but also for continued career advancement over time. CTE programs are the primary means by which high school and early postsecondary students can access and pursue these pathways at scale. Learn more about CTE.

Make It Easier for Schools and Districts to Attract Talent

A school's ability to recruit and retain effective teachers has a significant impact on the courses the school can offer. Math and science are consistently listed as teacher shortage areas by the Department of Education.[7] As demand for STEM jobs grows, spotlighting and expanding efforts to address teacher shortages through new pipelines, training, adjunct and alternative certifications will need to become more of a state priority. [8]

However, it's not just STEM. High-quality CTE programs also are challenged by a lack of qualified subject area instructors. Recruiting and retaining high-quality instructors requires more flexibility for certification and ongoing, progressive training and professional development that is reflective of current industry work environments. For example, a growing number of states are providing school districts the ability to certify staff locally or provisionally to address CTE instructor shortages.

Address Key Infrastructure Needs

Digital learning and access to online resources are key components to ensuring students have the tools necessary to succeed after high school. School districts' access to high-quality broadband has increased dramatically over the last five years. According to Education Superhighway, in 2013, 40 million students were not meeting the 100 kbps per student minimum connectivity goal for digital learning. The connectivity gap has narrowed by 84 percent. However, 6.5 million students remain unconnected to high speed broadband. State leadership can prioritize connectivity for the remaining students and schools. For more information, visit Education Superhighway.

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[7] U.S. Department of Education, "Teacher Shortage Areas." Available at https://tsa.ed.gov/#/home/.

[8] For example, in 2017, Arizona passed legislation (SB1042) that would allow highly-qualified professionals to be certified to teach. The professional would have significant experience in a subject matter, possess a higher education, and have passed a background check in order to be certified.

Part 4: Additional Findings and Access Comparison

In addition to the access issues outlined above, this analysis has also uncovered significant access issues impacting students in small schools across the country.

Access by Locale & Size

Rural Schools

Lack of access isn't just a rural problem like is often assumed. For example, look at the 10 states with the highest percentage of rural public elementary and secondary schools.[9] Nationally, the average number of rural schools in a state is 28 percent; however, more than *half* of schools in these 10 states are rural. In fact, rural schools account for nearly 75 percent of schools in South Dakota, Montana and Vermont.

The following table exhibits lack of access to Algebra I or higher. The table illustrates how even in the states with the most rural schools, lack of access isn't limited to rural schools.

For States with the Greatest Proportion of Rural Schools, Lack of Access Isn't Just a Rural Problem[10]

Percentage of Schools Without Access to Algebra I or Higher

	Rural Schools Without Access	Town Schools Without Access	Suburban Schools Without Access	City Schools Without Access
South Dakota	24%	6%	0%	47%
Montana	0%	2%	--	11%
Vermont	32%	5%	0%	33%
North Dakota	7%	2%	20%	0%
Maine	5%	3%	0%	0%
Alaska	12%	16%	14%	20%
Wyoming	9%	5%	--	33%
Nebraska	11%	3%	0%	33%
West Virginia	30%	22%	23%	19%
Oklahoma	2%	2%	0%	5%
National	**22%**	**13%**	**21%**	**30%**

[9] *U.S. Department of Education, National Center for Education Statistics (NCES), Common Core of Data (CCD), "Public Elementary/Secondary School Universe Survey", Provisional Version 1a, and the NCES Education Demographic and Geographic Estimates (EDGE), "Public Elementary/Secondary School Universe - Geographic Data," 2015-16.*

[10] *This table is not an exact comparison. The datasets compare rural regular public elementary and secondary schools to all public secondary schools. However, it provides a general sense of what access across locales looks like in highly rural states.*

School Size

One interesting finding our analysis uncovered concerns school sizes. We had assumed that rural schools' access gaps would be considerably higher than city, suburb or town schools. However, that was not the case. What seemed to matter most is school size.

Nationally, when comparing the very small high schools in the lowest quintile (schools with fewer than 93 students) with small high schools in the second quintile (schools with 93 to 263 students), we found a dramatic difference in access for schools with more than 93 students. For all math courses except Calculus, the gap in access between small schools and very small schools doubles. This is important because according to CCD[11], 18 percent of K-12 students attend schools serving 100 or fewer students.

Very Small Schools
Lack of Access Increases as Courses Become More Advanced

	Very Small High Schools Without Access	Small High Schools Without Access	All High Schools Without Access
MATH			
Algebra I or Higher	30%	13%	20%
Calculus	87%	57%	55%
SCIENCE			
Biology or Higher	36%	16%	23%
Physics	75%	45%	47%
ACCELERATION			
Advanced Placement	90%	62%	55%
Dual Enrollment	75%	43%	52%

[11] *U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "Public Elementary/Secondary School Universe Survey," 2013-14, 2014-15, and 2015-16.*

Access Comparison

The following tables and charts provide a more direct comparison of access across a single subject for all populations or a direct comparison across a single population for all subjects.

Access to Math Courses: Side-by-Side Comparison
% of Schools Without Access

	LOCALE				POVERTY		MINORITY		SCHOOL SIZE		ALL SCHOOLS
	Rural	Town	Suburb	City	Low (Q1)	High (Q5)	Low (Q1)	High (Q5)	Very Small (Q1)	Very Large (Q5)	
Algebra I or higher	22%	13%	21%	30%	16%	21%	12%	25%	30%	6%	**20%**
Geometry or higher	26%	15%	23%	33%	18%	26%	13%	29%	36%	7%	**23%**
Algebra II or higher	30%	18%	28%	37%	21%	32%	15%	35%	45%	8%	**28%**
Advanced Math or higher	40%	29%	38%	49%	29%	50%	22%	51%	68%	10%	**39%**
Calculus	53%	54%	47%	64%	39%	72%	40%	70%	87%	18%	**55%**

Access to Science Courses: Side-by-Side Comparison
% of Schools Without Access

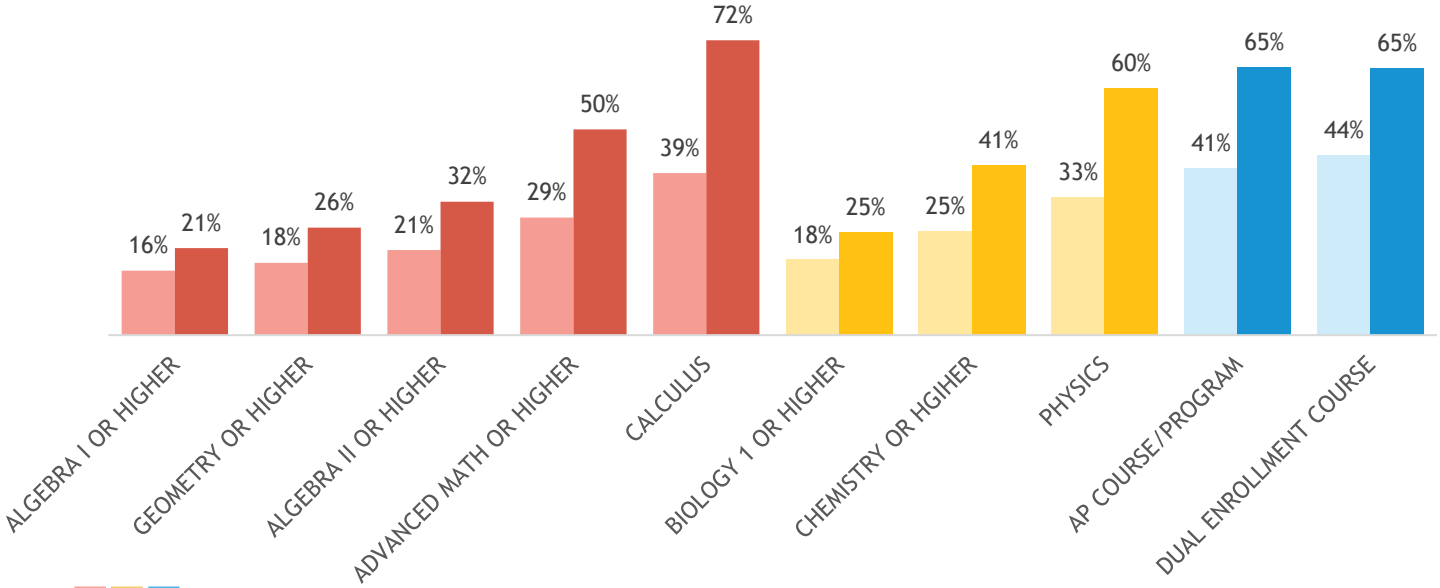
	LOCALE				POVERTY		MINORITY		SCHOOL SIZE		ALL SCHOOLS
	Rural	Town	Suburb	City	Low (Q1)	High (Q5)	Low (Q1)	High (Q5)	Very Small (Q1)	Very Large (Q5)	
Biology or higher	26%	15%	23%	33%	18%	25%	14%	29%	36%	7%	23%
Chemistry or higher	35%	23%	33%	42%	25%	41%	18%	42%	56%	9%	33%
Physics	47%	43%	41%	54%	33%	60%	31%	59%	75%	14%	47%

Access to Accelerated Courses: Side-by-Side Comparison
% of Schools Without Access

	LOCALE				POVERTY		MINORITY		SCHOOL SIZE		ALL SCHOOLS
	Rural	Town	Suburb	City	Low (Q1)	High (Q5)	Low (Q1)	High (Q5)	Very Small (Q1)	Very Large (Q5)	
Advanced Placement	56%	59%	44%	59%	41%	65%	48%	62%	90%	13%	55%
International Baccalaureate	99%	99%	95%	95%	96%	97%	99%	97%	100%	91%	97%
Dual Enrollment	49%	36%	54%	66%	44%	65%	33%	69%	75%	31%	52%

Schools Without Access Based on Student Poverty

Comparing Lowest and Highest Quintiles

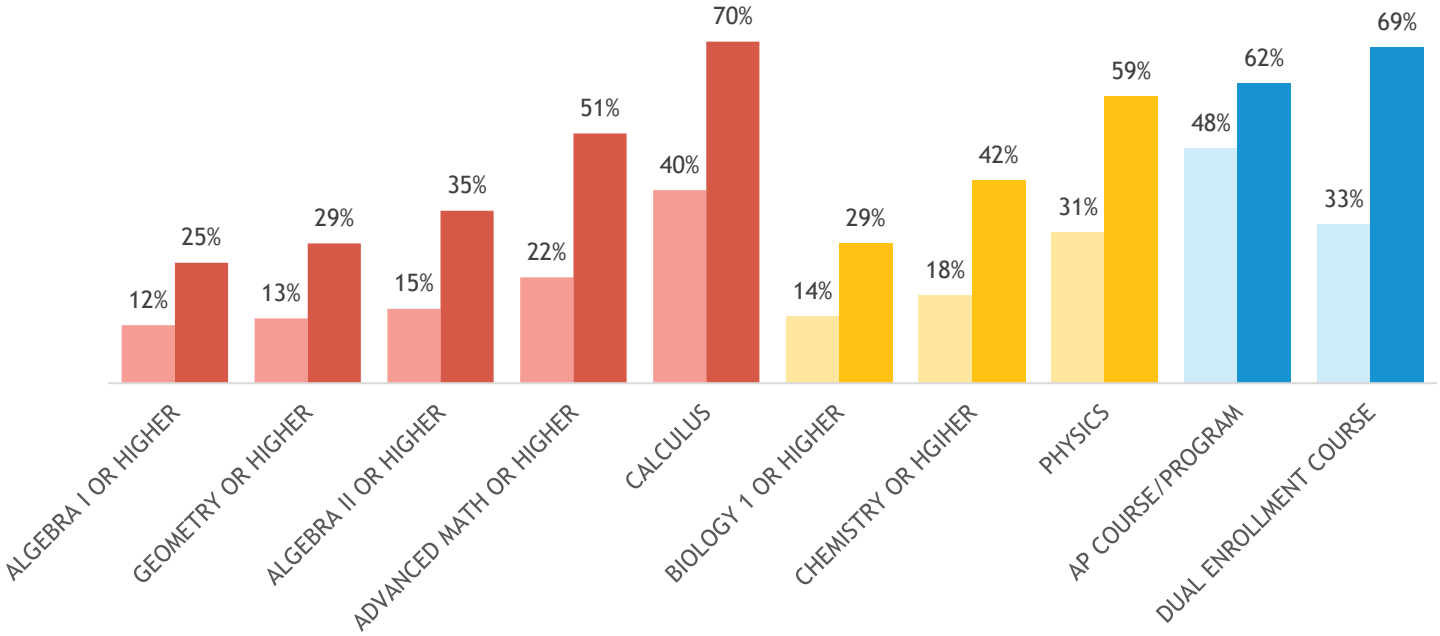


Q1 Low Poverty Schools represents schools in the 20th percentile or lower of FRPL students enrolled in those schools.

Q5 High Poverty Schools represents schools in the 80th percentile or higher of FRPL students enrolled in those schools.

Schools Without Access Based on Student Minority

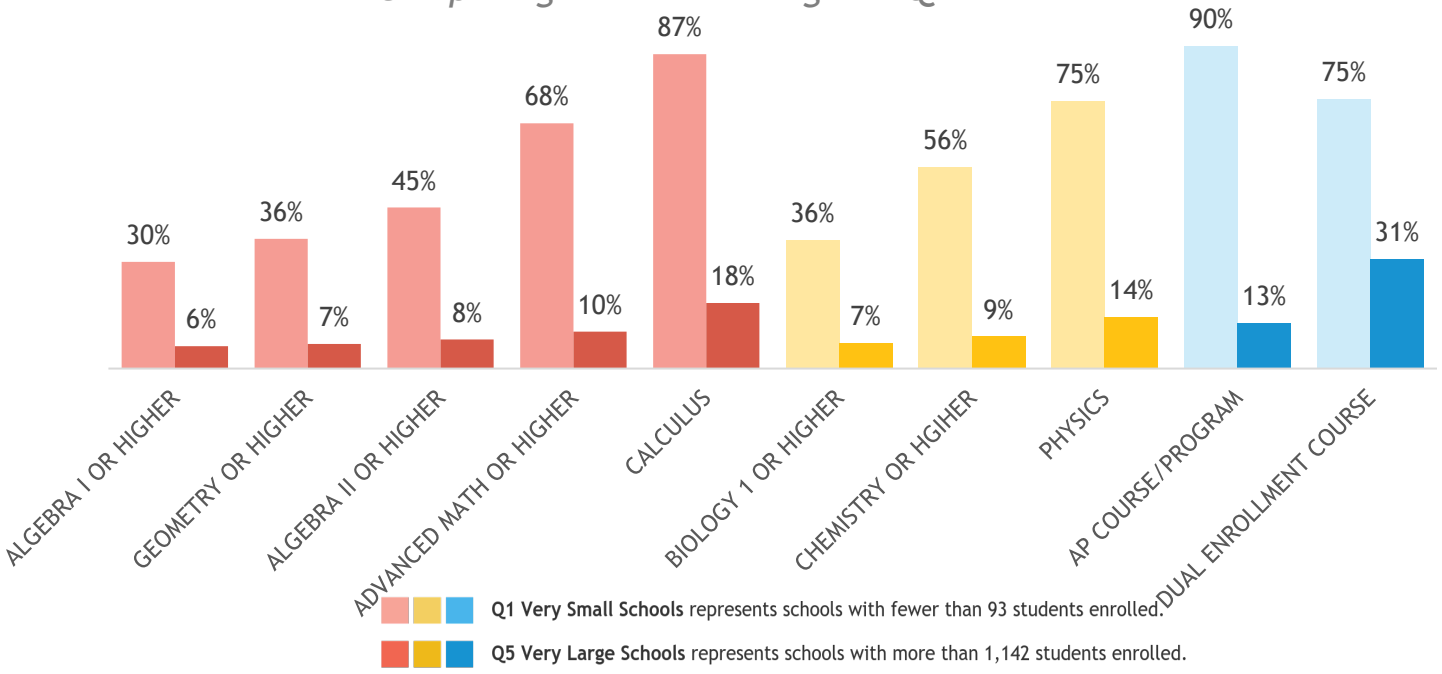
Comparing Lowest and Highest Quintiles



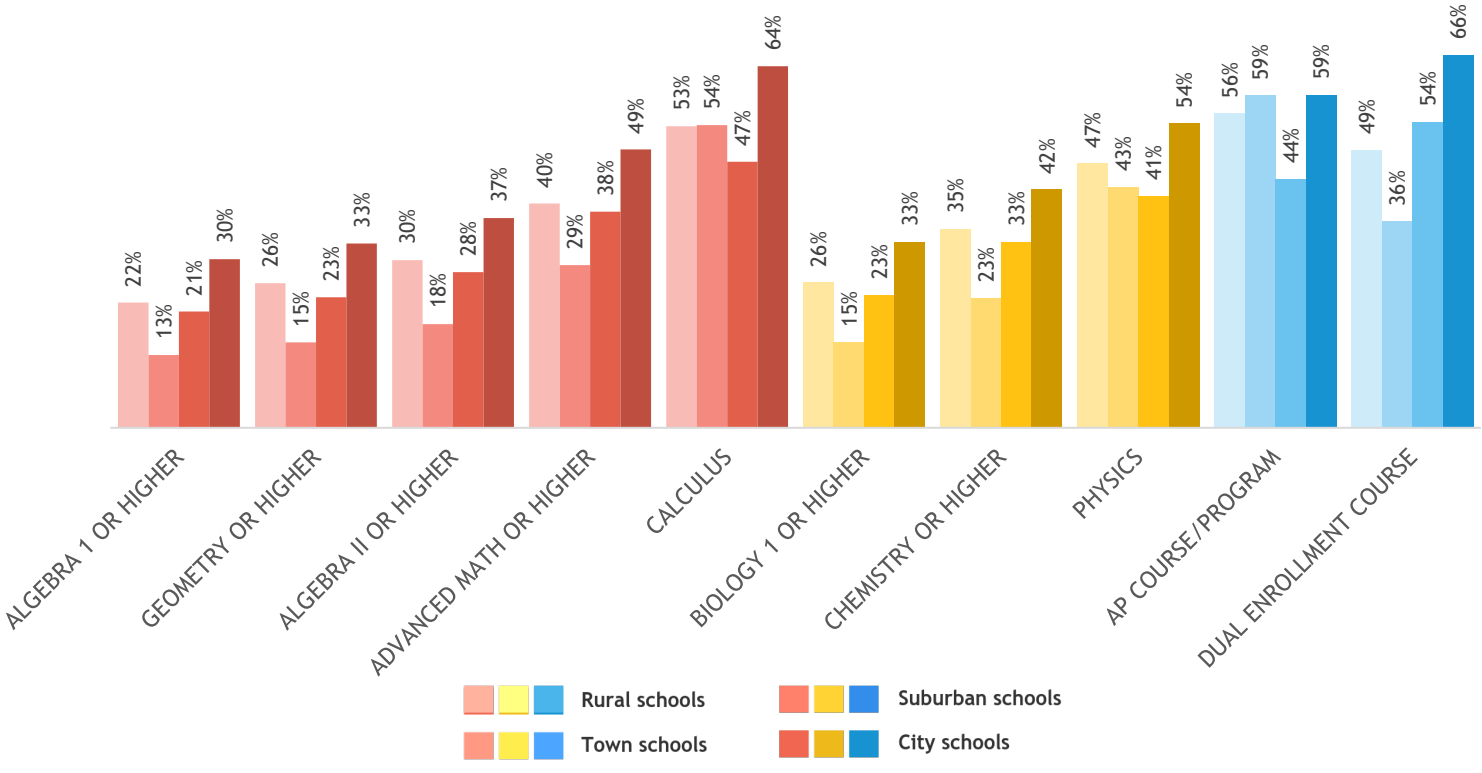
Q1 Low Minority Schools represents schools in the 20th percentile or lower of minority students enrolled in those schools.

Q5 High Minority Schools represents schools in the 80th percentile or higher of minority students enrolled in those schools.

Schools Without Access
Based on Student Enrollment
Comparing Lowest and Highest Quintiles



Schools Without Access
Based on Locale



Appendix A: Additional Information About the Data

Data Sources

Civil Rights Data Collection

The Civil Rights Data Collection (CRDC) is a biennial (i.e., every other school year) survey of public schools required by the U.S. Department of Education's Office of Civil Rights since 1968. CRDC collects data on leading civil rights indicators related to access and barriers to educational opportunity at the early childhood through grade 12 levels from public local educational agencies (LEA) and schools, including juvenile justice facilities, charter schools, alternative schools and schools serving only students with disabilities. Data collected includes enrollment demographics, math and science courses, Advanced Placement, discipline, teacher experience and much more. For more information, visit www.Ed.Gov/OCR/Data.

National Center for Education Statistics Common Core of Data

The Common Core of Data (CCD) is the Department of Education's primary database on public elementary and secondary education in the United States. CCD is a comprehensive, annual, national database of all public elementary and secondary schools and school districts. CCD data provide more accurate enrollment and grade-levels-offered data than CRDC alone. For more information, visit www.NCES.ED.Gov/CCD.

Excel*in*Ed's Dataset

Excel*in*Ed analyzed a subset of the 2015-16 CRDC data related to high school math, science, Advanced Placement, International Baccalaureate, dual enrollment and credit recovery course offerings and CCD data on locale, school type and enrollment. The NCES School IDs in both datasets enabled us to link the two datasets to provide the most accurate analysis. Multiple years of CCD were used to update and identify accurate enrollment, school types and grade level data.

Incorporating CCD data provides the ability to not only identify how many schools do not offer a specific course but what type of schools are more likely to do so. For example, simply using CRDC data we can find out how many schools do not offer Algebra II. However, by incorporating CCD data we can also find out whether these schools are more likely to be located in rural areas or if such schools typically enroll larger proportions of low-income and minority students.

Additionally, the CCD was used to provide accurate information about school characteristics, particularly school enrollments. While both the CRDC and CCD datasets included school enrollments for both overall and subgroups, these enrollments numbers were not in agreement for a number of schools. Previous CRDC and CCD datasets were used to determine what the most likely enrollments were; these likely enrollments were used in our analysis. Furthermore, previous datasets were also used to replace any missing or incorrect data on school characteristics such as identifying which schools were charter schools and which grade levels each school served.

View our dataset and a slide deck of our analysis.

Population

Excel*in*Ed's dataset analyzes 29,716 public schools offering grades 9, 10, 11 or 12. This is a broad definition of high school that gives better insight into schools that should be offering these courses.

Courses and Analysis

The analysis focuses on the course progression toward college and career readiness, including college or career preparatory courses.

- **Course Path for Math**: Algebra I or higher, Geometry or higher, Algebra II or higher, Advanced Math or higher and Calculus.
- **Course Path for Science**: Biology or higher, Chemistry or higher and Physics.
- **Accelerated Courses**: Advance Placement, International Baccalaureate, Dual Enrollment and Credit Recovery courses.

Excel*in*Ed chose to use course "or higher" in its analysis. The CRDC by itself does not identify schools that do not offer a specific course or higher. Simply identifying how many schools don't offer a specific course could be misleading especially in math and science where there is typically a traditional course progression. For example, CRDC data may identify a high school for not offering Algebra I. However, that school may still offer Geometry, Algebra II, Advanced Math and Calculus but not Algebra I because all their students completed Algebra I in middle school. As such, this high school would be wrongly identified as not providing access to such a foundational math course if using the CRDC data alone.

However, Excel*in*Ed chose to recognize that the high school offered courses "higher" than Algebra I would prevent such misidentification. This more accurately identifies schools that are not providing access to the courses their students need to graduate college and career ready.

Characteristics and Data Subsets

Most of the data are available by school level access, broken down school type, school-wide Title I, charters, magnets, locale, enrollment groups, minority enrollment groups, free- and reduced-price lunch enrollment groups, minority quintiles and free-and reduced-price lunch (FRPL) quintiles. State-level student data is available for course level access and by enrollment quintiles.

Dataset Limitations

While the CRDC is the most comprehensive dataset on access to college and career preparation courses, it has some limitations. The CRDC and Excel*in*Ed's analysis does not:

- **Include if students are accessing courses online**. While CRDC collects information on district online enrollment, it does not include course specifics.
- **Include non-core courses**. Data from 2015-16 are only collected for core courses—math, science, Advanced Placement, International Baccalaureate, dual enrollment and credit recovery. It does not include access to non-core courses, such as computer science or courses that would lead to an industry certification.
- **Reflect the current school year (2017-18)**. The data are only collected every two years and released 1-2 years after collection, meaning that our most up-to-date information is at least one school year old.
- **Reflect the quality of the course**.

Finally, the data are self-reported by schools and LEAs, and these reporting agencies have the opportunity to correct and recertify data identified by OCR as anomalies. This is the third year that all schools and LEAs were required to answer questions on college and career readiness (since 2011-12 when CRDC began asking all schools rather than a sample of schools). However, Excel*in*Ed did not independently verify the information from the 29,716 public schools reflected in Excel*in*Ed's analysis.

Appendix B: Minority Schools

Students in high schools serving high populations of minority students are significantly less likely to have access to courses needed to prepare them for college and career. The data consistently reveal that as the percentage of minority populations in schools increases, access to courses decreases.

The tables below display schools by quintiles. These quintiles are based on total enrollment of all schools, then we applied our criterion for high schools (schools offering grades 9, 10, 11 or 12). *Example: 12% of schools identified as "low minority" (within Q1) do not have access to Algebra I.*

Table 1.1 Percent and number of schools within minority quintiles with no access to core math courses.

	Q1 Low Minority *20th percentile or lower in percent of minority students*		Q2		Q3		Q4		Q5 High Minority *80th percentile or higher in percent of minority students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Algebra I or higher	12%	764	13%	689	17%	939	21%	1,246	25%	1,371	20%
Geometry or higher	13%	853	15%	790	20%	1,097	26%	1,502	29%	1,591	23%
Algebra II or higher	15%	980	19%	987	24%	1,307	32%	1,864	35%	1,962	28%
Advanced Math or higher	22%	1,395	29%	1,526	36%	1,988	47%	2,740	51%	2,841	39%
Calculus	40%	2,542	46%	2,446	52%	2,893	62%	3,625	70%	3,887	55%

Table 1.2 Percent and number of schools within minority quintiles with no access to core science courses.

	Q1 Low Minority *20th percentile or lower in percent of minority students*		Q2		Q3		Q4		Q5 High Minority *80th percentile or higher in percent of minority students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Biology or higher	14%	877	15%	798	20%	1,122	26%	1,513	29%	1,592	23%
Chemistry or higher	18%	1,163	23%	1,233	30%	1,662	39%	2,310	42%	2,312	33%
Physics	31%	1,990	37%	1,977	44%	2,443	53%	3,111	59%	3,265	47%

Table 1.3 Percent and number of schools within minority quintiles with no access to acceleration courses.

	Q1 Low Minority *20th percentile or lower in percent of minority students*		Q2		Q3		Q4		Q5 High Minority *80th percentile or higher in percent of minority students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Advanced Placement	48%	3,098	48%	2,541	50%	2,769	58%	3,427	62%	3,411	55%
International Baccalaureate	99%	6,313	97%	5,154	96%	5,303	95%	5,594	97%	5,380	97%
Dual Enrollment	33%	2,088	41%	2,160	49%	2,693	61%	3,579	69%	3,820	52%

APPENDIX C: POVERTY SCHOOLS

Students in high poverty high schools—those serving high populations of low-income students—are also significantly less likely to have access to courses needed to prepare students for college and career. The data consistently reveal that as the percentage of low-income populations in schools increases, access to courses decreases.

The tables below display schools by quintiles. These quintiles are based on total enrollment of all schools, then we applied our criterion for high schools (schools offering grades 9, 10, 11 or 12). *Example: 16% of schools identified as "low poverty" (within Q1) do not have access to Algebra I.*

Table 2.1 Percent and number of schools within poverty quintiles with no access to core math courses.

	Q1 Low Poverty *20th percentile or lower in percent of low-income students*		Q2		Q3		Q4		Q5 High Poverty *80th percentile or higher in percent of low-income students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Algebra I or higher	16%	838	10%	651	12%	699	21%	1,025	21%	835	20%
Geometry or higher	18%	940	12%	737	14%	811	25%	1,214	26%	1,031	23%
Algebra II or higher	21%	1,105	14%	897	18%	1,006	31%	1,523	32%	1,281	28%
Advanced Math or higher	29%	1,528	21%	1,348	29%	1,631	46%	2,274	50%	1,975	39%
Calculus	39%	2,105	38%	2,373	49%	2,750	66%	3,253	72%	2,829	55%

Table 2.2 Percent and number of schools within poverty quintiles with no access to core science courses.

	Q1 Low Poverty *20th percentile or lower in percent of low-income students*		Q2		Q3		Q4		Q5 High Poverty *80th percentile or higher in percent of low-income students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Biology or higher	18%	978	12%	776	15%	835	25%	1,216	25%	991	23%
Chemistry or higher	25%	1,345	18%	1,103	22%	1,261	37%	1,843	41%	1,629	33%
Physics	33%	1,787	30%	1,885	38%	2,157	54%	2,670	60%	2,366	47%

Table 2.3 Percent and number of schools within poverty quintiles with no access to acceleration courses.

	Q1 Low Poverty *20th percentile or lower in percent of low-income students*		Q2		Q3		Q4		Q5 High Poverty *80th percentile or higher in percent of low-income students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Advanced Placement	41%	2,172	42%	2,667	50%	2,822	62%	3,042	65%	2,574	55%
International Baccalaureate	96%	5,137	97%	6,070	96%	5,400	97%	4,784	97%	3,847	97%
Dual Enrollment	44%	2,335	34%	2,160	40%	2,266	58%	2,858	65%	2,562	52%

Appendix D: Small Schools

Students in high schools serving smaller numbers of students are less likely to have access to courses needed to prepare them for college and career. The data consistently reveal that as the student enrollment decreases, access to courses also decreases.

The tables below display schools by quintiles. These quintiles are based on total enrollment of all schools, then we applied our criterion for high schools (schools offering grades 9, 10, 11 or 12). *Example: 30% of schools identified as "very small" (within Q1) do not have access to Algebra I.*

Table 3.1 Percent and number of schools within student enrollment quintiles with no access to core math courses.

	Q1 Very Small *1 - 93 Students*		Q2 Small *93 - 263 Students*		Q3 Average *263 - 536 Students*		Q4 Large *536 -1142 Students*		Q5 Very Large *1,142 - 13,300 Students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Algebra I or higher	30%	3,010	13%	612	16%	463	15%	404	6%	520	20%
Geometry or higher	36%	3,659	15%	687	17%	490	15%	423	7%	574	23%
Algebra II or higher	45%	4,544	18%	835	19%	543	18%	500	8%	678	28%
Advanced Math or higher	68%	6,914	30%	1,378	25%	715	23%	623	10%	860	39%
Calculus	87%	8,864	57%	2,591	45%	1,295	41%	1,116	18%	1,527	55%

Table 3.2 Percent and number of schools within student enrollment quintiles with no access to core science courses.

	Q1 Very Small *1 - 93 Students*		Q2 Small *93 - 263 Students*		Q3 Average *263 - 536 Students*		Q4 Large *536 -1142 Students*		Q5 Very Large *1,142 - 13,300 Students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Biology or higher	36%	3,629	16%	727	18%	503	17%	457	7%	586	23%
Chemistry or higher	56%	5,691	24%	1,079	22%	617	20%	546	9%	747	33%
Physics	75%	7,553	45%	2,020	38%	1,087	34%	930	14%	1,196	47%

Table 3.3 Percent and number of schools within student enrollment quintiles with no access to acceleration courses.

	Q1 Very Small *1 - 93 Students*		Q2 Small *93 - 263 Students*		Q3 Average *263 - 536 Students*		Q4 Large *536 -1142 Students*		Q5 Very Large *1,142 - 13,300 Students*		All Schools
	%	#	%	#	%	#	%	#	%	#	
Advanced Placement	90%	9,101	62%	2,791	45%	1,284	37%	1,012	13%	1,058	55%
International Baccalaureate	100%	10,109	99%	4,495	99%	2,817	99%	2,706	91%	7,617	97%
Dual Enrollment	75%	7,602	43%	1,946	40%	1,132	40%	1,106	31%	2,554	52%