

Shortages and Inequities

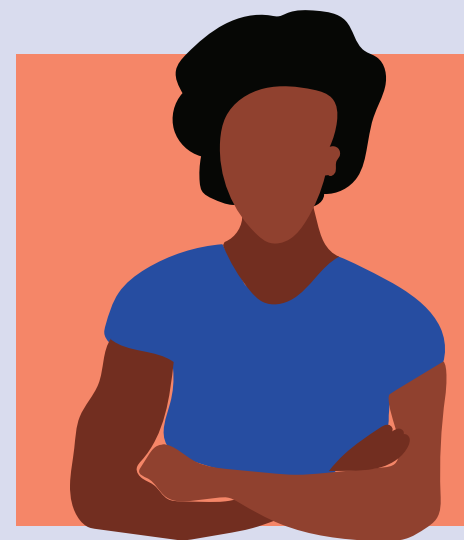
in the Philadelphia Public School Teacher Workforce

AUGUST 2020

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RESEARCH
for ACTION



About Research for Action

Research for Action (RFA) is a Philadelphia-based nonprofit education research organization. We seek to use research as the basis for the improvement of educational opportunities and outcomes for traditionally underserved children and students. Our work is designed to strengthen early education, public schools and postsecondary institutions; provide research-based recommendations to policymakers, practitioners, and the public; and enrich civic and community dialogue. For more information, please visit our website at www.researchforaction.org.

Acknowledgments

Support for this report was provided by the Neubauer Family Foundation and the William Penn Foundation. The opinions expressed in this report are those of the authors and do not necessarily reflect the views of the funders. Thank you to Jason Fontana for his extensive work on the analysis in this brief, and to the members of the RFA team who contributed to this project, including: Colin Yarnell, Jonathan Guevara, Mei Brown, Molly Pileggi and Kate Shaw.



Introduction

To facilitate student achievement, schools need a strong, well-prepared teacher workforce.¹ The COVID-19 pandemic and amplified calls for racial justice have also increased the public's recognition of the crucial roles educators and education can play in children's lives and in society more broadly. Unfortunately, Philadelphia's public schools faced teacher shortages even before the start of the pandemic. Recruiting and retaining highly qualified educators has long been a challenge in the city.²

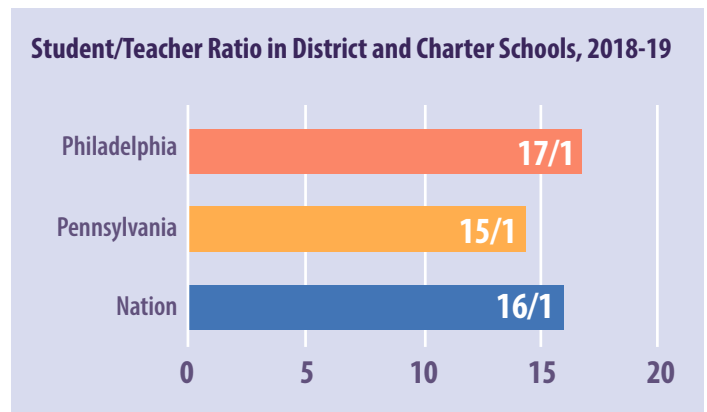
This brief provides an overview of the status of the teaching workforce in Philadelphia's 320 district and charter public schools. First, we discuss the extent of **teacher shortages** in Philadelphia. We then examine **racial and ethnic inequities** in the city's teacher supply and distribution. In the third section, we outline known **barriers** to successful teacher recruitment and retention in city schools. We conclude with **implications and recommendations** for Philadelphia to recruit and retain a qualified, more diverse teaching workforce.

A. Teacher Shortages in Philadelphia and Pennsylvania

Philadelphia has fewer teachers per student than state or national averages

- Statewide in 2018-19 there was one teacher for every 15 students. Philadelphia schools only had one teacher for every 17 students.
- Based on RFA's analysis, schools in the city of Philadelphia would have needed to add over 1,500 additional teachers just to reach the state average student/teacher ratio.

Figure 1: Student/Teacher Ratio



Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, 2018-19.

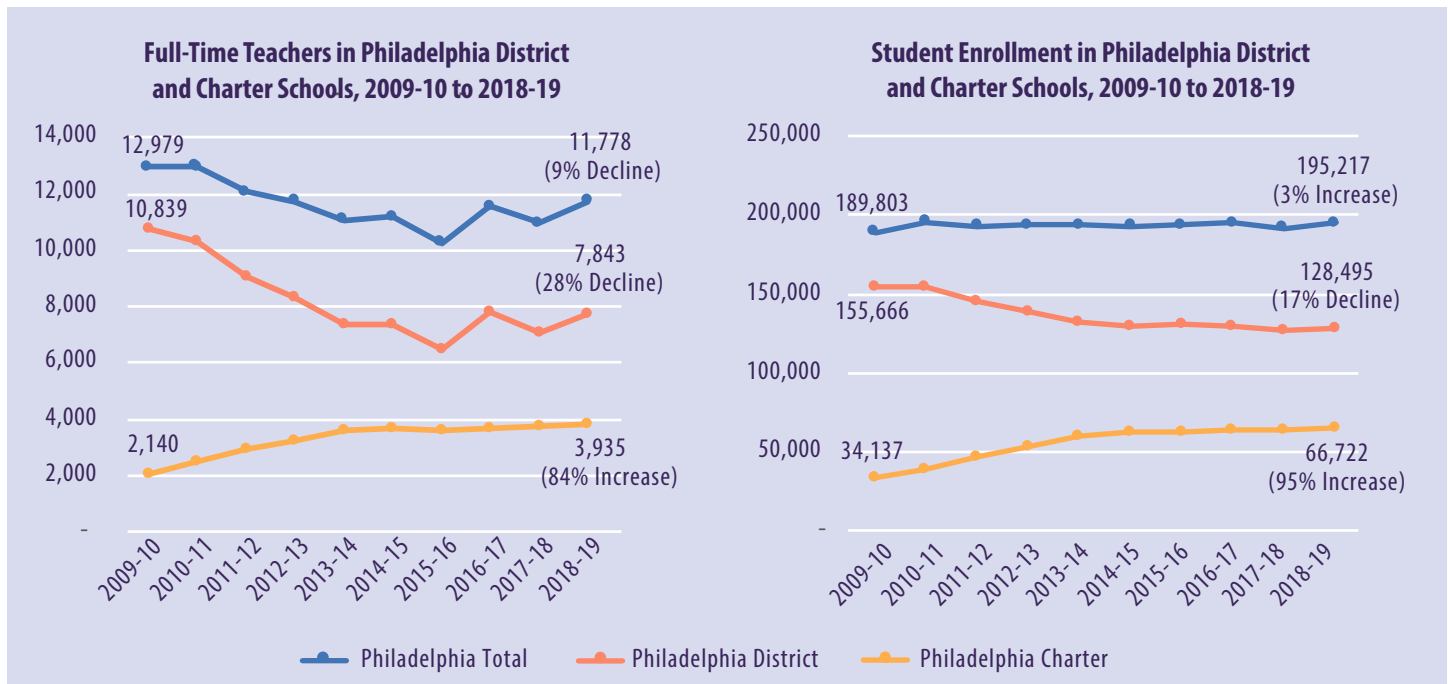
Note: Public schools in PA are included. Schools were excluded if they did not have available teacher and student data, served only pre-K or ungraded students, or were missing grade level values.

Teacher shortages in Philadelphia are most dire in the areas of special education, high school math, and middle grades English, math, and science.³ Most of these shortages mirror state and national trends,⁴ but are more significant in Philadelphia.

The need for teachers in Philadelphia is growing

Over the past decade, Philadelphia has seen a drop in the number of teachers despite an increase in the number of students. But these patterns are somewhat different in district and charter schools. Figure 2 displays these trends.

Figure 2. Number of Students and Teachers in Philadelphia



Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, 2007-08 to 2018-19.

Note: Public schools in PA are included. Schools were excluded if they did not have available teacher and student data, served only pre-K or ungraded students, or were missing grade level values.

- While the number of teachers in Philadelphia overall has declined to over 1,200 (-9%) between 2009-10 and 2018-19, the number of students has increased by over 5,400 students (+3%).
- The number of teachers in Philadelphia district schools declined by 28% while the number of students in district schools declined by 17%.
- Growth in the number of charter school teachers (+84%) did not keep pace with growth in student enrollment (+95%).

The state’s elimination of partial reimbursement to districts whose students enroll in charter schools makes it difficult for districts to maintain an adequate number of teachers. In a 2017 study, RFA found that charter school expansion in Pennsylvania creates a negative fiscal impact on district schools.⁵ Even with declining enrollment, school districts are not able to maintain services, including student/staffing ratios, while implementing budget cuts needed to accommodate the new costs districts must pay to charter schools.

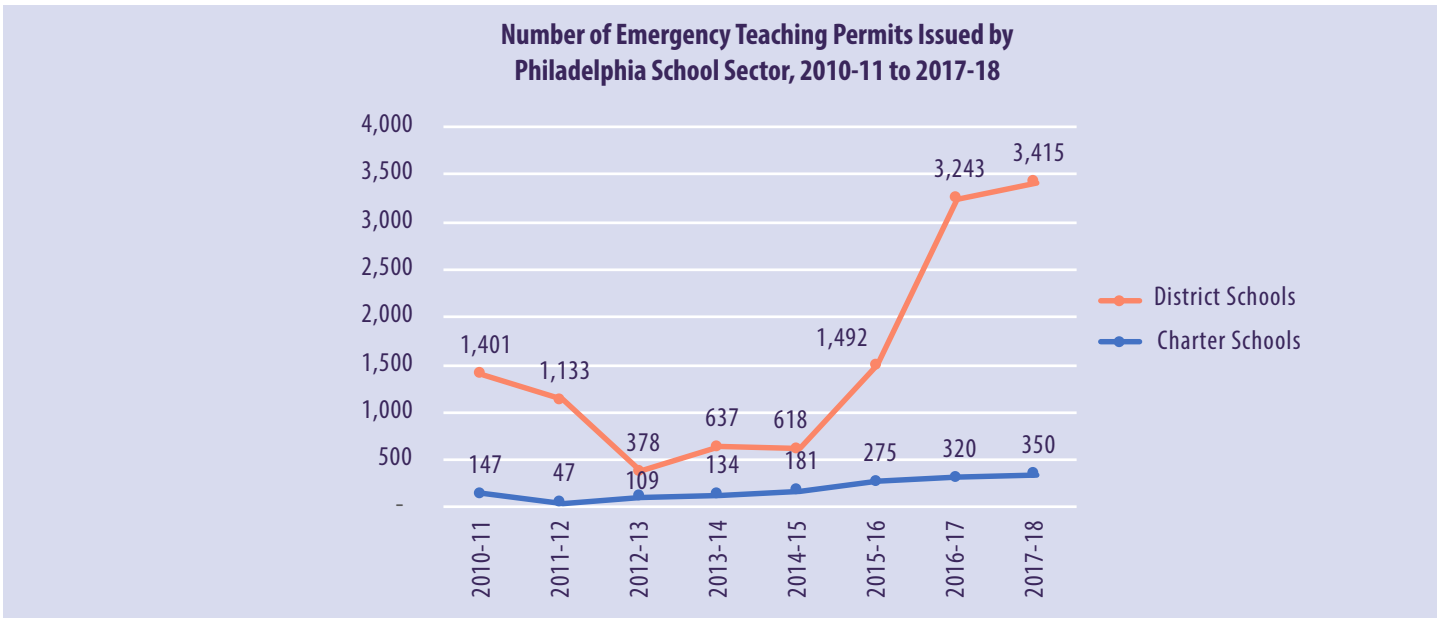
The School District of Philadelphia is increasingly relying on emergency teaching permits

When no qualified and certified candidate is available for an advertised teaching position, school districts can request that the Pennsylvania Department of Education (PDE) issue an Emergency Permit to staff that position with an uncertified day-to-day or long-term substitute teacher.⁶

Figure 3 illustrates the rapid growth of uncertified teachers with emergency teaching permits in the School District of Philadelphia since 2014-15. In contrast, the use of emergency teaching permits in the charter sector has remained relatively stable.



Figure 3. Emergency Teaching Permits

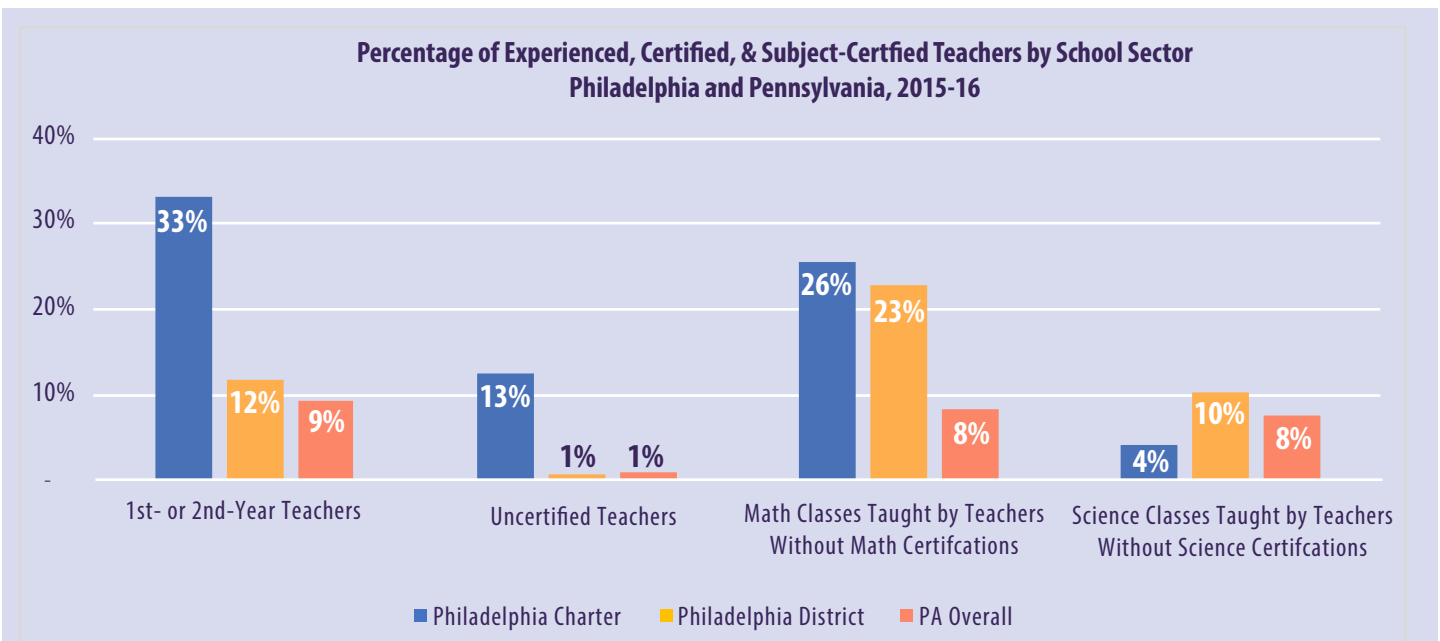


Source: Pennsylvania Department of Education, Act 82 Report on Educator Certificates, 2010-11 to 2017-18.

Philadelphia charter schools reported more inexperienced and uncertified teachers

Certified teachers have a regular/standard certificate, license, or endorsement issued by the state and have met all applicable state teacher certification requirements for a standard certificate. Teachers completing their state-required probationary period are considered certified, providing they have met the standard teacher education requirements. Teachers with alternative certifications, such as teachers with emergency, temporary, or provisional credentials, are not considered certified. Statewide, 0.5% of district teachers and 7% of teachers in charter schools are uncertified.

Figure 4: Experienced, Certified, and Subject-Certified Teachers



Source: U.S. Department of Education, Civil Rights Data Collection, 2015-16.



- Thirty-three percent of teachers in charter schools were only in their first or second year of teaching, compared to 12% in district schools.
- Thirteen percent of teachers in charter schools were uncertified, compared to one percent in district schools.
- Twenty-six percent of math classes in charter schools and 23% in district schools were taught by teachers not certified in math, while four percent of science classes in charter schools and 10% in district schools were taught by teachers not certified in science.¹

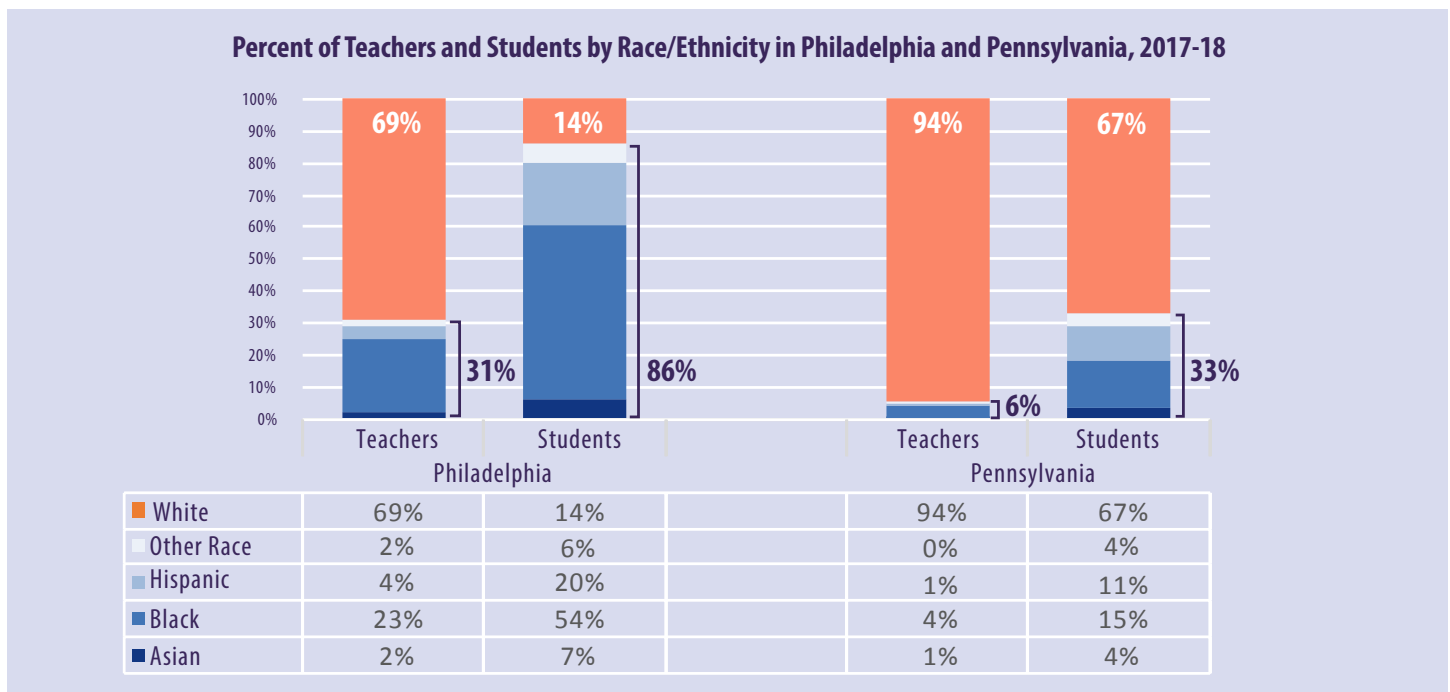
B. Racial and Ethnic Inequities in Teacher Supply and Distribution

Philadelphia's teaching force does not reflect the racial and ethnic diversity of the city's students

The School District of Philadelphia has among the most diverse teaching forces in the state.⁷ However, Philadelphia's students are far more diverse in terms of race and ethnicity than those who teach them. Moreover, the percent and number of teachers of color (i.e., nonwhite teachers) in Pennsylvania has declined during the past two decades.⁸

Figure 5 displays the racial and ethnic diversity of students and teachers across the state, and in Philadelphia, in the 2017-2018 school year. (Note: In discussing ethnicity, we use the term "Hispanic" throughout this brief to align with the terminology in our data sources).

Figure 5. Percent of Teachers and Students by Race/Ethnicity



Source: Pennsylvania Department of Education, Professional Staffing Data with Race/Ethnicity, 2018; Pennsylvania Department of Education, Enrollment Data, 2018.

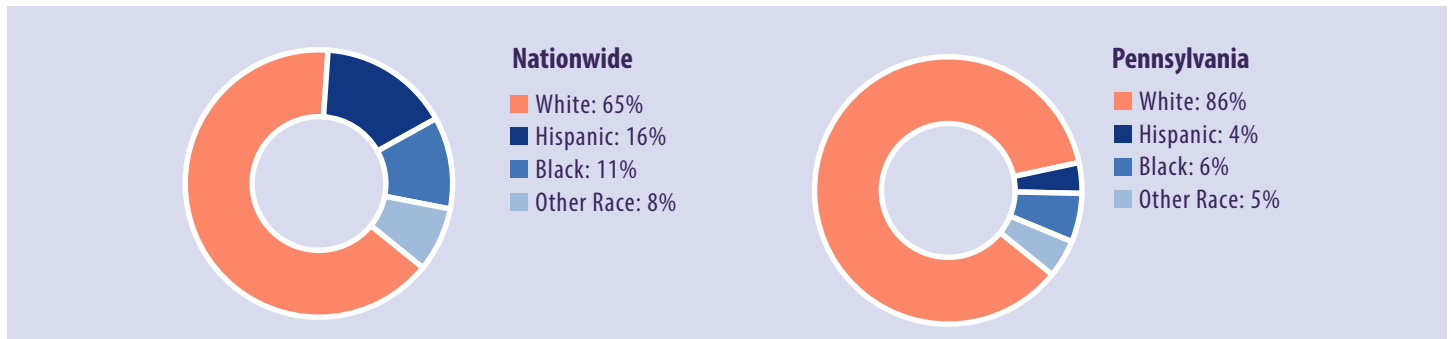
- The full-time teaching workforce in Philadelphia is comprised of roughly 31% teachers of color, as compared to 86% students of color.
- Teacher diversity is even more lacking in the state overall. In the 2017-18 school year, fewer than 6% of public school teachers in Pennsylvania were persons of color, compared to 33% of students.

¹ These "uncertified" math and science teachers may hold a teacher certificate in some other subject area.

The percentage of students of color in Pennsylvania’s teacher preparation programs is well below the national average.

In 2018-19, teacher preparation programs in Pennsylvania enrolled 1,751 students of color (14% of all enrollees). By contrast, 35% of teacher preparation program enrollees nationally are people of color.⁹ Figure 6 displays the race and ethnicity of teacher preparation students nationwide and for Pennsylvania.

Figure 6. Percent of Teacher Preparation Program Enrollees by Race/Ethnicity in Pennsylvania and Nationwide, 2018-19



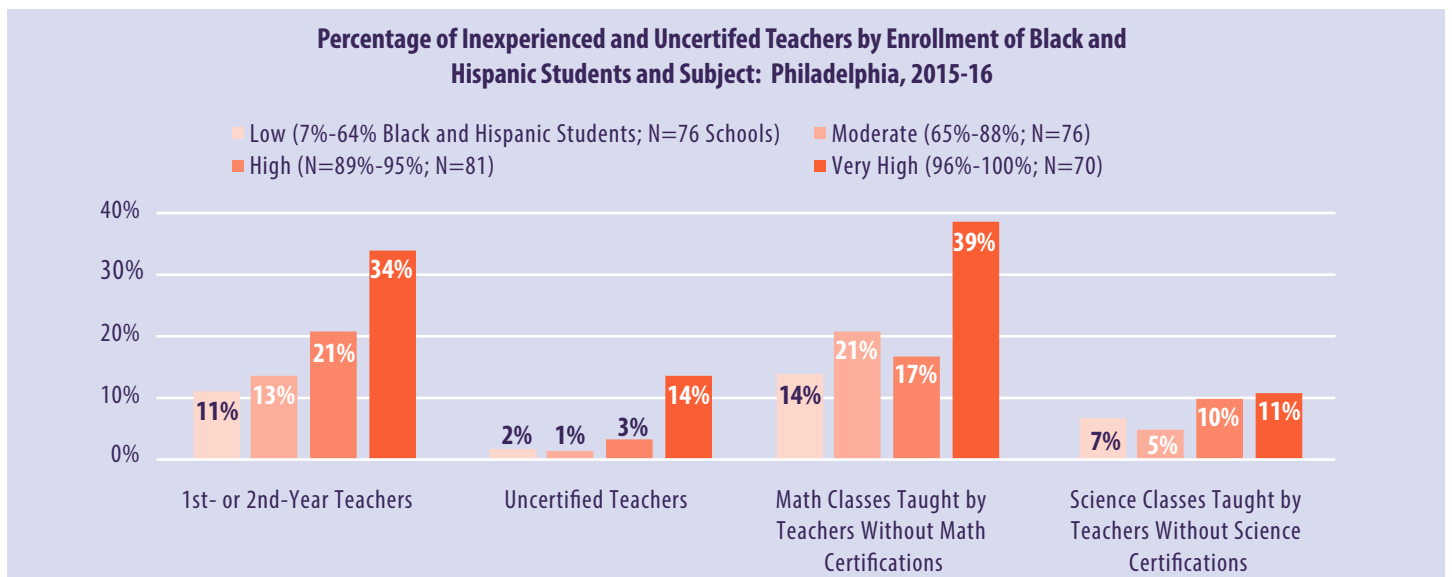
Source: U.S. Department of Education, Office of Postsecondary Education. Higher Education Act Title II reporting system, 2018-19.

Teachers of color have been found to promote higher expectations for students of color, and to contribute to: positive academic and non-academic outcomes for students of color; a reduction in teacher turnover in hard-to-staff schools; improved school climates; and the mitigation of implicit bias in all students. Furthermore, on average, all students report more favorable perceptions of teachers of color than of white teachers.¹⁰

Within Philadelphia district and charter schools, Black and Hispanic students are taught by more inexperienced and uncertified teachers

The racial and ethnic demographics of students in Philadelphia district and charter schools vary greatly. So too does the distribution of teachers. Figure 7 below displays how inexperienced and uncertified teachers correlated to the demographics of students in schools in the 2015-16 school year.

Figure 7. Percentage of Inexperienced and Uncertified Teachers by Enrollment of Black and Hispanic Students



Source: U.S. Department of Education, Civil Rights Data Collection, 2015-16.

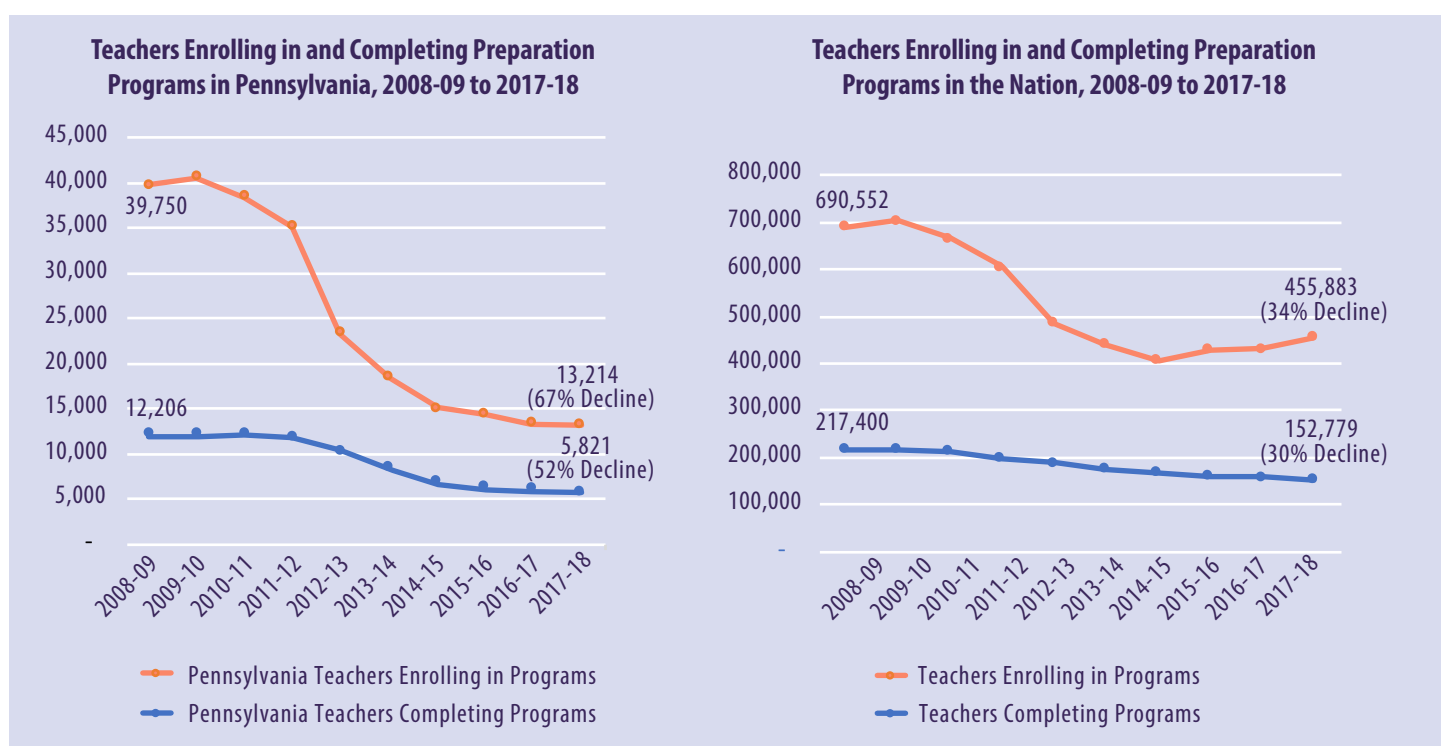
- In schools with the highest percentages of Black and Hispanic students, 34% of all teachers had only one or two years of experience and 14% of teachers were uncertified.
- In contrast, 11% of teachers in schools with the lowest percentage of Black and Hispanic students were inexperienced, and 2% were uncertified.
- Math certification rates were particularly poor in schools with the highest percentages of Black and Hispanic students, with 39% of math classes taught by teachers not certified in math.

C. Teacher Recruitment and Retention: Challenges and Barriers

Fewer candidates are enrolling in or completing teacher preparation programs in Pennsylvania

Across the country, enrollment in teacher preparation programs has dropped dramatically. Yet drops in Pennsylvania are even more severe. And completion rates are also declining. Figure 8 displays trends in enrollment and completion over the last decade.

Figure 8. Teachers Enrolling in and Completing Preparation Programs in Pennsylvania and the Nation



Source: U.S. Department of Education, Office of Postsecondary Education. Higher Education Act Title II reporting system, 2018.

- Nationally, enrollment in teacher preparation programs declined by 34% over 10 years.
- Enrollment declined during that time in Pennsylvania by 67% (from 39,750 to only 13,214).
- Program *completion* declined by 30% nationally and by 52% statewide.

Teacher preparation costs pose a significant barrier to enrollment and completion, and passing required teacher certification exams can present additional challenges for some potential teaching candidates.¹¹

Pennsylvania's Teacher Certification Process (Traditional Route)

In Pennsylvania, 97% of teacher preparation candidates are enrolled in traditional programs offered by state-approved institutions of higher education.¹² In this traditional route, candidates must:

- Complete and post qualifying scores in basic skills assessments¹³
- Complete all program coursework and practice requirements, and
- Post qualifying scores in content area exams before applying for an instructional certificate through the PDE's Teacher Information Management System.¹⁴

Other pathways through which candidates can become teachers in Pennsylvania include Master's or Post-Baccalaureate Programs, Teacher Intern Certification Programs, Temporary Teaching Permits, Career and Technical Intern Certifications, and Emergency Permits.

Teacher turnover is a serious problem for Philadelphia

A stable teaching force is centrally important to student learning. Turnover (i.e., teachers moving to other schools and leaving the profession) negatively impacts student achievement.¹⁵ **Nationally, roughly eight percent of teachers leave teaching each year, while another eight percent move to other schools.**¹⁶ Most teachers leave pre-retirement (though many of those leavers do later re-enter the teaching force).¹⁷ Important factors influencing the decisions of "leavers" include personal life events; the desire to change careers and/or earn a higher salary; dissatisfaction with school administration; and dissatisfaction with the impact of student assessments and school accountability measures on instruction or curriculum.¹⁸

Turnover rates are much higher in Philadelphia than national averages. A 2018 PERC study found that annually from 2009-10 through 2015-16, **an average of 27% of teachers moved schools within Philadelphia or left the school district entirely.**¹⁹ Over half these movers and leavers exited the district—about three percent to teach in charter schools in Philadelphia and about ten percent to teach in other public schools in Pennsylvania. More than *half* of first-year teachers were mobile, and math, science, and English teachers were particularly mobile.²⁰

Some Philadelphia schools experience extremely high rates of teacher turnover. A 2019 *Philadelphia Inquirer* investigation identified 26 district schools that either lost at least 25% of teachers for four consecutive years or lost over a third of teachers for two consecutive years.²¹ Almost all of those schools predominately serve students of color from low-income neighborhoods.

Philadelphia teachers report a range of challenges that can lead to turnover

A. Inadequate Preparation

- According to a 2018 report from Temple University, 62% of a sample of new Philadelphia teachers reported feeling "not at all prepared" or "somewhat prepared" (as opposed to "prepared" or "extremely prepared") to teach in an urban classroom.²² (However, Black teachers felt prepared at higher rates).
 - Most were unfamiliar with high-poverty contexts, and they evinced a need for substantive training in cultural competence.²³
 - Some felt unprepared to address students' experiences of trauma and their "pressing physical and psychological needs."²⁴
- These teachers suggested that more exposure to practical skills and to classrooms similar to those they would teach in would strengthen their preparation programs.²⁵

B. Test Pressures, Lack of Support, and Inadequate Resources

- On SDP's 2018-19 teacher survey, 47% of respondents disagreed or strongly disagreed with the statement that "teacher morale is high."²⁶ Respondents reported that the following issues, among others, posed "great" or "moderate" challenges for them:



- Students being academically unprepared (71% of respondents)
- Pressure for students to perform well on the state standardized tests (57% of respondents)
- Shortages of instructional support staff (e.g., teacher aides and reading specialists) (50% of respondents)
- New teachers in Philadelphia sometimes struggle with having too much autonomy and are overwhelmed by the responsibilities they face.²⁷ Many of these teachers feel isolated from peers,²⁸ unsupported (including by school leadership),²⁹ and in need of strong mentorship.³⁰
- On the District’s principal survey, 70% of respondents reported that a lack of adequate funding was a “great” or “moderate” challenge to student learning at their school.³¹ Indeed, some new teachers in Philadelphia experience shock at the lack of resources in the city’s schools—including such basic necessities as books and paper.³² Some teachers who leave cite toxic environmental conditions in the city’s schools.³³

C. Low Salaries

In SDP, the starting salary for regular education teachers in 2019 was between \$46,267 and \$52,903. The starting salary for special education teachers was slightly higher—between \$47,118 and \$53,750.³⁴ Meanwhile, the average teacher salary in SDP is \$72,524.

Average salaries are significantly lower than those in most districts that border Philadelphia. Moreover, Philadelphia classrooms hold much higher percentages of students requiring additional or specialized attention. Table 1 below provides these comparisons.

Table 1: Average Teacher Salary and District Characteristics in Philadelphia-Area School Districts

	Average Salary, 2019-20 (Highest to Lowest)	Student / Teacher Ratio, 2018-19	Student Characteristics, 2018-19				
			Economic Disadvantage	Special Education	Students of Color	Homeless or Foster Care	English Learners
Council Rock	\$105,137	15	10%	15%	14%	0.3%	2%
Lower Merion	\$101,939	12	10%	15%	31%	0.3%	3%
Colonial	\$96,307	13	23%	17%	26%	0.9%	2%
Neshaminy	\$94,323	16	30%	17%	21%	1.2%	2%
Lower Moreland Township	\$93,472	14	16%	15%	23%	0.4%	6%
Cheltenham	\$91,789	12	34%	17%	70%	2.1%	3%
Abington	\$89,777	15	25%	15%	38%	0.7%	2%
Bensalem Township	\$86,180	15	57%	19%	49%	2.9%	10%
Springfield	\$77,756	15	19%	15%	20%	0.7%	2%
Interboro	\$76,108	13	56%	21%	25%	1.7%	1%
Philadelphia	\$72,524	16	69%	17%	86%	3.9%	12%
William Penn	\$72,286	16	73%	18%	96%	3.4%	5%
Southeast Delco	\$71,826	16	80%	17%	84%	2.0%	3%
Upper Darby	\$65,096	15	68%	15%	75%	2.2%	9%

Source: Future Ready PA, PDE. “2019-20 Professional Staff Summary Report”; U.S. Department of Education, National Center for Education Statistics, Common Core of Data, 2018-19. Student/Teacher Ratio Note: Public schools in PA are included. Schools were excluded if they did not have available teacher and student data, served only pre-K or ungraded students, or were missing grade level values.



Salaries

Salaries influence decisions to enter, leave, and return to the teaching profession.³⁵ Offering higher wages can increase college graduates' willingness to teach.³⁶ Yet teacher salaries are frequently inadequate to sustain life in the middle-class,³⁷ particularly in high-poverty districts, where the highest-paid teachers are compensated 35% less than their counterparts in affluent districts.³⁸ Teachers receiving lower wages are more likely to leave the profession.³⁹

Implications and Recommendations

Many of the barriers and challenges to improving recruitment and retention of a qualified, more diverse teaching force are endemic to the structural inequity within which the Philadelphia school system operates. For example, Pennsylvania's schools are routinely ranked among the most inequitably funded of any state in the nation.⁴⁰ A recent RFA study found that in high schools, Pennsylvania's statewide gaps in access to educational opportunities between black/white students and between students from low-income/high-income families are respectively the fourth and fifth widest in the country.⁴¹ Philadelphia schools have long operated on the losing end of these trends, and efforts to eliminate broader inequity may prove the most effective long-term strategy for strengthening the teacher workforce in the city.

Yet there are targeted strategies that have been shown to help with recruitment and retention efforts. Many of these are already being tested by the School District of Philadelphia and its partners, including institutions of higher education that offer teacher preparation programs. In Table 2, we provide an overview of research-based strategies to strengthen teacher recruitment and retention.

Table 2: Strategies to Strengthen Teacher Recruitment and Retention

<p>Recruitment-Focused Strategies</p> <p>↓</p> <p>Retention-Focused Strategies</p>	Defray preparation costs , including by offering merit scholarships to future Philadelphia teachers and expanding residency programming ⁴²
	Help current and past enrollees to complete teacher preparation programs and pass certification exams ⁴³
	Develop and expand pipelines for teachers of color ⁴⁴
	Enhance hiring practices and cultivate hiring partnerships to bring more teachers, including teachers of color, to Philadelphia schools ⁴⁵
	Recruit from out of state and from elsewhere in the state, relax reciprocity regulations, ⁴⁶ and bring retired teachers back to the system ⁴⁷
	Incentivize educators to teach at high-turnover schools , by using strategies such as long-term stipends ⁴⁸
	Advance teachers' cultural competency , ⁴⁹ invest in programming and processes that address racial inequities , ⁵⁰ and foster supportive, inclusive work environments , including for teachers of color ⁵¹
	Bolster induction and mentorship programs , offering teachers multiple years of support ⁵²
	Encourage and support teacher collaboration ⁵³
	Provide high-quality training for principals ⁵⁴ and leadership opportunities for teachers ⁵⁵

To be most effective, recruitment and retention efforts should be coordinated and comprehensive. Many of the strategies above should be enacted in conjunction. For example, there is some evidence that comprehensive induction supports alone may not impact teacher retention or student achievement in the short term.⁵⁶ And, while stipends for teaching at “hard-to-staff” schools may bring educators in the door, strategies are needed to retain those educators—not only by ensuring that monetary incentives are lasting,⁵⁷ but also by ensuring that those schools feature supportive and collaborative working environments.⁵⁸

Endnotes

- 1 Podolsky, Anne, Linda Darling-Hammond, Christopher Doss, and Sean Reardon. *California's Positive Outliers: Districts Beating the Odds*. Palo Alto, CA: Learning Policy Institute, 2019. ("Our analyses confirm the widespread finding that teachers play an important role in contributing to student achievement... We find that the extent of preparation as reflected by teacher certification status has a strong association with average achievement for all students. After controlling for salaries and experience, the percent of teachers holding substandard credentials is significantly and negatively associated with student achievement. In these districts, for every 10% increase in the percent of teachers working on emergency permits, waivers, or intern credentials, the average achievement for students of color is lower, on average, by almost 0.10 standard deviations. For White students, every 10% increase in the percent of teachers teaching on substandard credentials is associated with achievement that is nearly .07 standard deviations lower" (p. 16) https://learningpolicyinstitute.org/sites/default/files/product-files/Positive_Outliers_Quantitative_REPORT.pdf
- 2 See Neild, Ruth Curran, Elizabeth Useem, Eva F. Travers, and Joy Lesnick. *Once and for All: Placing a Highly Qualified Teacher in Every Philadelphia Classroom*. Philadelphia, PA: Research for Action, 2003. https://8rri53pm0cs22jk3vvqna1ub-wpengine.netdna-ssl.com/wp-content/uploads/2016/03/Neild_R_Once_and_For_All-1.pdf; Neild, Ruth Curran, Elizabeth Useem, and Elizabeth Farley. *The Quest for Quality: Recruiting and Retaining Teachers in Philadelphia*. Philadelphia, PA: Research for Action, 2005. https://8rri53pm0cs22jk3vvqna1ub-wpengine.netdna-ssl.com/wp-content/uploads/2016/03/Neild_R_Quest_for_Quality.pdf; Useem, Elizabeth, Robert Offenber, and Elizabeth Farley. *Closing the Teacher Quality Gap in Philadelphia: New Hope and Old Hurdles*. Philadelphia, PA: Research for Action, 2007. http://8rri53pm0cs22jk3vvqna1ub-wpengine.netdna-ssl.com/wp-content/uploads/2016/01/Useem_B_Closing_the_TQ_Gap.pdf
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- 5 Lapp, David, Joshua Lin, Erik Dalson, and Della Moran. *The Fiscal Impact of Charter School Expansion: Calculations in Six Pennsylvania School Districts*. Philadelphia, PA: Research for Action, 2017. <https://www.researchforaction.org/publications/fiscal-impact-charter-school-expansion-calculations-six-pennsylvania-school-districts/>
- 6 An individual is qualified for an Emergency Permit if they hold a bachelor's degree. PDE. (n.d.). Emergency Permits. Harrisburg, PA. <https://www.education.pa.gov/Educators/Certification/CertFAQs/Pages/EmergencyPermits.aspx>
- 7 Philadelphia SD has the second-highest percentage of nonwhite teachers of all Pennsylvania school districts. Pennsylvania Department of Education, Professional Staffing Data with Race/Ethnicity, 2018; Pennsylvania Department of Education, Enrollment Data, 2018.
- 8 Lijia Lui and Dale Mezzacappa. "More than half of Pa. schools have no teachers of color" *The Notebook*, October 30, 2018. <https://thenotebook.org/articles/2018/10/30/more-than-half-of-pa-districts-have-no-teachers-of-color/> ("In 2001-02, 34 percent of Philadelphia teachers were black – one in three. Today, that number is at 23 percent.")
- 9 U.S. Department of Education, 2019 Title II Reports National Teacher Preparation Data. https://title2.ed.gov/Public/Report/DataFiles/DataFiles.aspx?p=5_01
- 10 See Cherng, Hua-Yu Sebastian and Peter F. Halpin. "The Importance of Minority Teachers: Student Perceptions of Minority Versus White Teachers." *Educational Researcher* 45, no. 7 (2016): 407-420; Dee, Thomas S. "Teachers, Race, and Student Achievement in a Randomized Experiment." *The Review of Economics and Statistics* 86, no. 1 (2004): 195-210; Egalite, Anna J., Brian Kisida, and Marcus A. Winters. "Representation in the Classroom: The Effect of Own-Race Teachers on Student Achievement." *Economics of Education Review* 45, (2015): 44-52.; Fox, Lindsay. "Seeing Potential: The Effects of Student-Teacher Demographic Congruence on Teacher Expectations and Recommendations." *AERA Open* 2, no. 1 (2015;2016); Gershenson, Seth, Cassandra M. D. Hart, Joshua Hyman, Constance Lindsay, and Nicholas W. Papageorge. *The Long-Run Impacts of Same-Race Teachers*. Vol. no. w25254. National Bureau of Economic Research, 2018; Griffin, Ashley and Hilary Tackie. *Through our Eyes: Perspectives and Reflections from Black Teachers*. New York, NY: The Education Trust, 2016. <https://edtrust.org/wp-content/uploads/2014/09/ThroughOurEyes.pdf>; Holt, Stephen B. and Seth Gershenson. "The Impact of Demographic Representation on Absences and Suspensions." *Policy Studies Journal* 47, no. 4 (2019): 1063-1093; Lindsay, Constance A. and Cassandra M. D. Hart. "Exposure to Same-Race Teachers and Student Disciplinary Outcomes for Black Students in North Carolina." *Educational Evaluation and Policy Analysis* 39, no. 3 (2017): 485-510; Villegas, Ana María and Jacqueline Jordan Irvine. "Diversifying the Teaching Force: An Examination of Major Arguments." *The Urban Review* 42, no. 3 (2010): 175-192.
- 11 Carver-Thomas, Desiree. *Diversifying the Teaching Profession: How to Recruit and Retain Teachers of Color*. Palo Alto, CA: Learning Policy Institute, 2018. https://learningpolicyinstitute.org/sites/default/files/product-files/Diversifying_Teaching_Profession_REPORT_0.pdf
- 12 Pennsylvania Department of Education, Act 82 Report on Educator Certificates, 2018.



13 Teacher preparation candidates have multiple options to fulfill the basic skills assessment requirements for reading writing, and mathematics. Candidates can use scores from the ACT, CORE, PAPA, or the SAT and a mix of scores. Candidates can also use scores from the PPST if the test series was taken before 2013. PDE. *Current Certification Test and Score Requirements*. Harrisburg, PA, 2019. <https://www.education.pa.gov/Educators/Certification/CertTestingRequirements/Pages/default.aspx>

Additionally, candidates can fulfill the math component of the basic skills assessments by completing a PDE-approved math course. PDE. *Pathways to Demonstrate Basic Skills for Teacher Certification Candidates*. Harrisburg, PA, 2019. <https://www.education.pa.gov/Documents/Teachers-Administrators/Certifications/Certification%20Testing/Basic%20Skills%20Assessment%20Options%20Guide.pdf>

14 PDE (n.d.). *Certification Pathways*. Harrisburg, PA. <https://www.education.pa.gov/Educators/Certification/BecomeAnEducator/CertificationPathways/Pages/default.aspx>

15 Ronfeldt, Matthew, Susanna Loeb, and James Wyckoff. "How teacher turnover harms student achievement." *American Educational Research Journal* 50, no. 1 (2013): 4–36. <https://doi.org/10.3102/0002831212463813>; see also Jessica Calefati, Dylan Purcell, and Kristen Graham, "Turnstile Teaching," *The Philadelphia Inquirer*, April 26, 2019. <https://www.inquirer.com/education/a/philadelphia-school-district-teacher-turnover-20190425.html>

16 National Center for Education Statistics. "Table 210.30. Mobility of public elementary and secondary teachers, by selected teacher and school characteristics: Selected years, 1987-88 through 2012-13." https://nces.ed.gov/programs/digest/d18/tables/dt18_210.30.asp; see Podolsky, Anne, Tara Kini, Linda Darling-Hammond, and Joseph Bishop. "Strategies for Attracting and Retaining Educators: What Does the Evidence Say?" *Education Policy Analysis Archives* 27 (2019): 38. <https://doi.org/10.14507/epaa.27.3722>, <https://epaa.asu.edu/ojs/article/view/3722/2231>; Sutchter, Leib, Linda Darling-Hammond, and Desiree Carver-Thomas. "Understanding Teacher Shortages: An Analysis of Teacher Supply and Demand in the United States." *Education Policy Analysis Archives* 27 (2019): 35. <https://doi.org/10.14507/epaa.27.3696>, <https://epaa.asu.edu/ojs/article/view/3696/2228>

17 Sutchter, Leib, Linda Darling-Hammond, and Desiree Carver-Thomas. "Understanding Teacher Shortages: An Analysis of Teacher Supply and Demand in the United States." *Education Policy Analysis Archives* 27 (2019): 35. <https://doi.org/10.14507/epaa.27.3696>, <https://epaa.asu.edu/ojs/article/view/3696/2228>

18 National Center for Education Statistics. "Schools and Staffing Survey." Data from 2012-13. https://nces.ed.gov/surveys/sass/tables/tfs1213_190507_f1n.asp

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