



The Preuss School at UCSD:
Academic Performance of the Class of 2011

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Executive Summary

This report presents information on the academic performance of students who graduated from the Preuss School in 2011 and comparison group students who applied to the school in 2004, but did not “win” acceptance to the school via a random lottery. We examine the performance of these two groups of students on several measures: the standardized tests they took in the 2 years prior to application to the school, and then while in middle and high school; and, their high school grade point averages, A-G course completion rates and high school exit exams. SAT scores, AP course completion rates and college-going information for The Preuss School Class of 2011 are compared against the averages achieved by students in the San Diego Unified School District and San Diego County, as the student level data for comparison group students was not available for analysis.¹

When the initial applicant pool to the Class of 2011 was split by the lottery into the Preuss and comparison groups, there was a concern that the “luck of the draw” may have concentrated academically talented students into one group relative to the other. To test for this a statistical analysis of pre-lottery standardized test performance was conducted. The results of those analyses suggest that the pre-lottery test scores were very similar across Preuss and Comparison group students. This means that differences between the groups emerging over time are mostly likely due to subsequent school effects, rather than initial differences in the academic credentials of the two groups. Major group differences on important academic indicators appeared in the following areas:

- ❖ There were significant differences in the scores achieved by students in the Preuss and comparison groups on the standardized tests. Preuss students performed better on multiple tests, including all the English Language Arts tests taken in grades 8 through 11, as well as the physics and chemistry tests. In all instances where there was a statistical difference, students attending the Preuss School outperformed students in the comparison group.
- ❖ Preuss students completed the courses required for admission to public colleges and universities at a much higher rate than students in the comparison group.
- ❖ Preuss students had significantly higher cumulative grade point averages than comparison group students. Nearly a 1/2 grade point difference in the cumulative weighted grade point average was large enough to impact college eligibility and the competitive standing of college applications.
- ❖ 81% of Preuss graduates filed a “Statement of Intent to Register” (SIR) with the University of California, the California State University System, private four-year institutions or public universities outside the State of California. Of the remaining students, 18% had plans to continue their education at a community college, and the educational objectives of one student were not known.²

¹ Publicly available data was the primary source of information on comparison group performance. While useful, these resources are not exhaustive and information on all desired performance indicators was not available. Because of this, there are unavoidable gaps in our ability to examine the relative performance of the Preuss and the comparison group. Specifically, information on college entrance examinations and college acceptance is not collected by SDUSD, so we are unable directly measure the performance of the two groups.

² The San Diego Unified School District does not collect SIR information on their graduates, so we are unable to compare the performance of the two groups of students on this measure.

Section 1: School Characteristics and Issues in the Analysis

The Preuss School is a grade 6-12 charter school located on the campus of the University of California, San Diego. It was founded to expand educational opportunity for students from low-income households. The School offers all students a rigorous academic curriculum supported by a differentiated system of academic and social supports, including a longer school day, a longer school year, intensive tutoring, mentoring, counseling, and parent education opportunities.

Tables 1.1 through 1.3 show 2010/2011 enrollment by grade level, the Race/Ethnicity of students, and the average class size in selected subject areas. Teachers at the Preuss School have a similar average class size relative to the San Diego Unified School district (SDUSD), and at times larger classes.

Table 1.1 Enrollments by Grade – 2010/2011 Academic Year

Grade	Enrollment
Grade 6	118
Grade 7	168
Grade 8	116
Grade 9	114
Grade 10	107
Grade 11	94
Grade 12	98
Total	816

Source: California Department of Education, Educational Demographics Office (CBEDS)

Table 1.2 Enrollment Race/Ethnicity 2010/2011 Academic Year

	PREUSS SCHOOL		SDUSD
	Enrollment	Percent of Total	Percent of Total
American Indian	0	0.00%	0.70%
Asian	141	17.28%	5.80%
Pacific Islander	2	0.25%	0.70%
Filipino	10	1.23%	4.30%
Hispanic	545	66.79%	46.50%
African American	75	9.19%	5.80%
White	25	3.06%	32.40%
Multiple/No Response	18	2.21%	3.80%
Total	816	100.00%	100.0%

Source: California Department of Education, Educational Demographics Office <http://www.eddata.k12.ca.us/>

Table 1.3 Average Class Size 2010/2011 Academic Year

	SCHOOL		DISTRICT
	Number of Classes	Average Class Size	Average Class Size
Schoolwide	206	26.8	24.3
English	31	27.0	22.8
Math	38	23.8	23.5
Social Science	18	28.8	25.1
Science	29	28.4	26.8

Source: California Department of Education, Educational Demographics, <http://www.eddata.k12.ca.us/>

The Preuss School admits only students who qualify for federal meal assistance at the time of application and whose parents or guardians have not graduated from a four-year college. In addition, the School seeks students who show academic promise but who may not have lived up to their full potential. Admission to the school follows a two-step process: 1) screening for criteria above and 2) selection by lottery. In the screening step, several readers score each completed application and identify students/families meeting the demographic criteria and demonstrating academic potential³. In a 2012 review of the Preuss admissions process, staff found that to date, the majority of applicants have been pulled *into* the school's admissions lottery (see below) in this process. In the 2011 – 2012 academic year, for example, 428 students applied for admission to the 6th- 8th grades. Of the 352 applicants whose parents met the basic income and education requirements, 342 (97 percent) were entered into the admissions lottery.

If the number of screened applicants meeting the admission criteria exceeds the spaces available in the 6th grade class, a lottery is held and the results of that random drawing determine which students receive an offer of admission to the school. Students who are unsuccessful in the lottery are placed on a waitlist and these students are admitted to the School if and when space becomes available. Parental interest in the Preuss School has increased to the point that it is virtually guaranteed that a lottery will be held for Preuss admission into the foreseeable future.

Because the lottery splits the applicant pool into two demographically matched groups, accepted and wait-listed students (the comparison group), it allows us to follow the progress of students over time in a quasi-experimental fashion and determine if (and how) the groups differ on several academic indicators.⁴ In this report, we examine the performance of the Preuss and comparison groups across four sets of academic indicators: standardized tests, unweighted and weighted GPA, progress toward (or completion) of A-G admission requirements, and pass rates on the California High School Exit Exam (CAHSEE).

Possible Issues in the Analysis:

Before we could be confident that the results reported were based on a fair and transparent treatment of the data, several issues needed to be addressed. We examined the data extensively and identified three areas that were of particular concern, because they could work against an isolation of “school effect.” By this we mean that a factor other than attending either the Preuss School or one of the schools in the San Diego Unified School District was producing any observed group differences. The three areas of concern were:

1. *Pre-Lottery Standardized Test Performance.* Did the Preuss and Comparison students start out at similar academic levels? For example, did the comparison group students have, on average, much higher mathematics standardized test scores before the start of 6th grade? This is an important consideration because while a lottery guarantees that each student in the final applicant pool has an equal chance of “winning” entry to Preuss; “luck of the draw” in a single lottery drawing could still result in an uneven distribution of academic talent in the resulting groups.

3 Personnel at the Preuss School have told us that the criteria used to determine “academic potential” were not restrictive. Applicants were not required to demonstrate high academic achievement, only potential, as evidenced by letters of support from teachers or personal statements. Applicants are not screened on the basis of GPA or test scores.

4 We are grateful to the San Diego Unified School District, which has generously granted access to academic data for the students in the comparison group, allowing us to perform the analyses presented. Only students in the comparison group who attended one of the San Diego City Schools are included in this report.

2. *Attrition.* Because we are primarily concerned with the performance of the groups over the seven academic years from admission to graduation (6th to 12th grade), there might be differences in the number and/or characteristics of students leaving the Preuss or comparison group. The question is this: over time, were the students who left the groups substantially different from those who started in their respective group? While it's unlikely, it might be the case that academically high performing students left the comparison group much more frequently than students in the Preuss group. In this example, attrition alone would make the performance of the Preuss group appear much better than that of the comparison group, for reasons completely unrelated to learning or supports provided by the schools.
3. *Access to student records.* This is always a concern. If we are unable to gain access to the academic records of some students, at what point does this work against a fair assessment of the academic achievement of the two groups?

We now describe how we resolved these three areas of statistical concern:

1) *Pre-lottery standardized test performance:*

Any time that a single lottery is used to separate a pool of students into two groups, it can result by chance in an unequal distribution of attributes -- for example, more girls in one group than the other. Because of the Preuss entrance requirements, all students/parents entered into the lottery meet specific income and education criteria, and it is likely that all applicants have a similar high motivation to achieve academically. For these reasons, the lottery would have no effect on the distribution of these important demographic characteristics; each group would receive, on average, students with matching demographic and motivational characteristics. However, a lottery does not guarantee that Preuss and comparison groups would receive students with equal academic prowess. Simple "luck of the draw" might have resulted in more students with high (or low) achievement concentrated in either the Preuss or comparison group. Because of this concern, we examined the "pre-lottery" academic performance of the students in the two groups created by the lottery, to determine if differences existed and if those differences were statistically and practically important.

We chose to use standardized test scores as the measure to determine if the two groups started out with similar academic characteristics. The choice was not made because of the innate superiority of standardized test scores as a measure, but for the simple reason that there was no other set of objective measures consistently available across school sites. We deliberately chose not to use academic marks (i.e., GPA) as a baseline indicator because standards (and marks) vary from school to school for reasons other than academic performance; this is especially true in elementary school, grades K-6.

When the pre-lottery standardized test performance for Preuss and comparison groups is statistically indistinguishable (by convention, an observed p -value greater than 0.05), it allows us only to conclude that there is no evidence for group differences on these measures. It is important to point out that being able to say that there was "no statistically significant difference" is not the same as saying that we are positive that no academic differences existed between the groups. Had other objective measures of academic achievement been available, those measures may have demonstrated group differences.

To determine if the pre-lottery performance of the Preuss and Comparison groups was different, we compared scaled scores from tests administered in the spring 2003 and in the

application year (2004).⁵ Table 1.4 shows the group performance on the standardized tests (significant observed *p*-values are <.05) for the Class of 2011. There were no statistical differences between the pre-lottery test scores of students in the Preuss and Comparison groups in the two years of test scores examined. These results tell us that, for these measures, there is no evidence suggesting an initial difference in the distribution of academic talent in the Preuss and Comparison groups. It is important to note that both Preuss and comparison group students scored considerably higher than the district average scale score for economically disadvantaged students in all four subject areas of the 4th & 5th grade CAT6.

Table 1.4 Class of 2011 - Pre-Lottery Standardized Test Results

TEST SUBJECT AREA (YEAR TAKEN)	PREUSS AVG SCALE SCORE	COMP. AVG SCALE SCORE	DIFF- ERENCE	P- VALUE	DISTRICT AVG SCALE SCORE*
CAT6 Language Arts 4 th (2003)	666 (N=107)	659 (N=95)	7	0.1498	618
CAT6 Language Arts 5 th (2004)	678 (N=108)	676 (N=97)	2	0.4973	637
CAT6 Mathematics 4 th (2003)	661 (N=107)	657 (N=95)	4	0.2877	615
CAT6 Mathematics 5 th (2004)	685 (N=108)	676 (N=97)	9	0.1595	632
CAT6 Reading 4 th (2003)	662 (N=107)	655 (N=95)	7	0.1245	617
CAT6 Reading 5 th (2004)	673 (N=108)	671 (N=97)	2	0.4875	634
CAT6 Spelling 4 th (2003)	651 (N=107)	651 (N=95)	0	0.9216	615
CAT6 Spelling 5 th (2004)	668 (N=108)	667 (N=97)	1	0.7783	632
*For economically disadvantaged students					
Source: SDUSD data; California Department of Education (http://star.cde.ca.gov/star2003/viewreport.asp)					

2) Effect of attrition:

Our second concern was that the Preuss and comparison groups might have experienced different rates of student loss over time and that, even if both groups lost the same percentage of students, the students who left one group may have been qualitatively different from the students that left the other group. For example, if the Preuss group lost only high-performing students while the comparison group lost a representative group of students, an unequal and unfair comparison would be created between the two groups. A Preuss loss of only high-performing students may have resulted in lower average academic performance scores for Preuss, relative to what they would have been without such attrition. The comparison group would not have experienced this, thus the unfair comparison. Concentration of high or low performing students in a group due solely to attrition would affect the average performance of a group for reasons unconnected to student knowledge, quality of teaching or other school effects.

To test for this we computed the average pre-lottery test score of all the initial members of the Preuss group and then computed the average pre-lottery test score for all students who remained in the group at the end of the 2010/2011 academic year (final group). The process was repeated on the comparison group. Table 1.5 shows the results of those calculations. To

⁵ Scaled scores are raw test scores that have been adjusted to account for content differences in versions of a standardized test. They allow for an "apples to apples" comparison of test performance. "Raw scores identify the number of items answered correctly on a test or sub-test. Raw scores are limited in their measurement precision because of differences among test items. For example, some items are more difficult than others. A scaled score takes item differences into account and is calculated to provide a more precise measure of the knowledge or skills tested. Through this calculation, an increase of one point at one place on the scale is described as being equal to a one- point increase anywhere else on the scale. Scaled scores are particularly useful for reporting changes over time" (California Department of Education).

determine the net effect of attrition, a final column was calculated: Effect = (Preuss Final Members - Preuss Initial Members) - (Comparison Final Members - Comparison Initial members). A positive number (expressed in scale score points) means that attrition tended to raise the test scores of the final Preuss group relative to the comparison group, while a negative number means the opposite, that attrition tended to raise the test scores of the final comparison group relative to the Preuss group.

For the Class of 2011 the effect of attrition was small and in favor of the Preuss group. Preuss students who left the school tended to have slightly lower test scores than those who remained, while Comparison group students who left the district tended to have slightly higher test scores, in each of the four areas tested, than those who remained. Therefore, attrition could play a *small* part in any test score differences between Preuss and Comparison group students. It is important to keep in mind the magnitude of the observed differences – in all cases the difference was less than 1%, a difference that seems unlikely to be of practical importance.

Table 1.5 Class of 2011 Pre-Lottery Test Scores: Effect of Attrition

TEST SUBJECT AREA (YEAR TAKEN)	PREUSS (FINAL)	PREUSS (INITIAL)	COMP. (FINAL)	COMP. (INITIAL)	EFFECT
CAT6 Language Arts 5 th (2004)	679 (N=64)	678 (N=108)	673 (N=58)	676 (N=97)	4
CAT6 Mathematics 5 th (2004)	685 (N=64)	685 (N=108)	670 (N=58)	676 (N=97)	6
CAT6 Reading 5 th (2004)	675 (N=64)	673 (N=108)	667 (N=58)	671 (N=97)	6
CAT6 Spelling 5 th (2004)	668 (N=64)	668 (N=108)	662 (N=58)	667 (N=97)	5

3) Effect of data availability:

Data availability is always a concern. We currently have access to student level data from the San Diego Unified School District (SDUSD) and while this access is invaluable, we are concerned that as more and more students apply from outside SDUSD, we will lose the ability to track these students. It's reasonable to conclude that as more students from outside SDUSD apply to Preuss, these students will have a greater representation in the post-lottery comparison groups. While we have no direct evidence, it's seems reasonable that unsuccessful lottery participants from schools outside SDUSD will elect to complete elementary school (grade 6) at their current school, rather than move to a SDUSD elementary school. This can and does result in an immediate "loss" of comparison group student data; for the class of 2011, 8 out of the 97 waitlisted students applied from outside the SDUSD district or were attending private schools when they applied. Thus, roughly 8% of the comparison group was immediately "lost" due to an inability to access their academic records in the years post lottery. Missing data is always problematic and we cannot calculate the exact impact of that loss, but the academic profile of these 8 students was indistinguishable from other comparison group students on pre-lottery measures (Table 1.4), suggesting that their loss did not materially effect our analyses.

A related data issue has to do with students in the comparison group *leaving* SDUSD schools. Students not returning to their school in the following term (or academic year) are not required to report the transfer to their former school or provide information on the new school they plan to attend. This is problematic because we are not able to determine where (or if) students are continuing their education. Even if we knew where students moved (assuming that they were still in San Diego County) it is not practical to negotiate data sharing agreements with multiple school districts (there are 43 districts in San Diego County) for the release of the student level data required for analyses. Complicating this issue further are the subset of

students who drop out of high school, do not take tests and are not tracked by any school district; these students are lost for analysis purposes.

We have worked with the Preuss School to address this potentially serious data access problem by modifying the application to the school, so that parental consent is obtained for the release of contact information (home and cell phone, home address) as well as permission to access current and future academic records. While we do have enduring permission from applicants to access records (and to contact the parents of applicants), from a practical standpoint this is a labor intensive approach to collecting missing data. There is no incentive for parents of applicants declined admission to Preuss to help provide access to academic records, and the other potential source of data (the school districts where these students continued their education) may lack the resources (or willingness) to respond to such requests. It is our hope that this problem will “self-resolve” as the CALPADS initiative (permanent student ID’s and warehousing of academic data) moves slowly forward in the State of California; once fully implemented CALPADS offers the promise of improved data access to researchers, for all students in the State, regardless of school attended.

Section 2: Issues Surrounding Standardized Test Performance

In this section and the section that follows, we examine the standardized tests taken by the Class of 2011 from grades 6 through 11 (students are not tested in 12th grade). Over the past decade, the State of California has changed the standardized test used to assess student performance, settling, for the time being, on the California Standards Test (CST).⁶ The CST was phased in over a period of years and this is the last year where multiple measures are required to present a complete picture of standardized test performance. In some ways the end of this transition to the CST represents a marked improvement; for several years, California used a combination of the California Achievement Test, Version 6 (CAT-6), the Scholastic Aptitude Test, version 9 (SAT 9) and the CSTs to measure student performance. This combination of tests was confusing because it mixed grade level examinations (e.g., 9th grade mathematics) and course based examinations (e.g., Algebra I), which could not be directly compared.

It is clear from Table 2.1 that Preuss and comparison groups took the English and History examinations (History/Social Science, World History and U.S. History) during the same years and the analysis of performance in those subjects is straightforward. The interpretation of CST results are not, however, issue free – two issues have direct bearing on the interpretability of test performance. The first is an issue of alignment -- that is, the timing of course offerings and student entry into courses. A good example can be seen in test taking patterns of Biology: all Preuss students took the Biology examination in 11th grade, but students in the district were taking Biology in 9th, 10th and 11th grades. This is a problem because the CST examinations are not vertically aligned,⁷ meaning that test scores from one year cannot be compared to scores from a different year. In the case of Biology examinations, this means that we can only perform a statistical test on scores taken in 11th grade; we cannot collapse all comparison group Biology test scores into a single group for analytic purposes. The second issue is small group size. When the number of students taking a CST examination does not exceed 10-12, it is likely that

⁶ Unfortunately this is a temporary situation. With the adoption of the Common Core Standards in 2014 it is anticipated that the standardized tests will also change. We do not have firm information on when these new tests will be introduced.

⁷ By “vertically integrated” we’re referring to the psychometric properties of the examinations. As designed, the tests can’t be compared across years, but successive cohorts can be compared. For example, 9th grade algebra can be compared in successive years, but 9th grade students taking algebra cannot be compared to students taking an identical course in 8th or 10th grade.

statistical tests lack “power” – the ability to detect group differences, if they exist. Below this numeric threshold, the results of statistical tests are not reported as there was not a reasonable expectation that the tests performed were capable of detecting any “true” group differences. As can be seen in the table, there are multiple instances where small numbers of students prevented statistical analysis.

Table 2.1 - Class of 2011 CST Test-Taking Patterns Since 2006

TEST	2007 GRADE 8		2008 GRADE 9		2009 GRADE 10		2010 GRADE 11	
	Preuss	Comp.	Preuss	Comp.	Preuss	Comp.	Preuss	Comp.
English	100%	96.6%	100%	98.3%	97.6%	100%	98.8%	100%
History/Social Sci.	100%	96.6%	-	-	-	-	-	-
World History	-	-	-	8.6%	100%	86.2%	-	-
U.S. History	-	-	-	-	-	-	100%	100%
General Math	-	13.8%	-	-	-	-	-	-
Algebra 1	81.2%	82.8%	2.9%	24.1%	-	5.2%	-	-
Geometry	18.8%	1.7%	78.3%	69.0%	21.7%	24.1%	1.4%	5.2%
Algebra 2	-	-	18.8%	5.2%	60.9%	56.9%	27.5%	31.0%
H.S. Math 9-11	-	-	-	-	17.4%	5.2%	69.6%	51.7%
Int Math 1	-	-	-	-	-	3.4%	-	6.9%
Int Math 2	-	-	-	-	-	1.7%	-	-
Int Math 3	-	-	-	-	-	-	-	-
Science 8	100%	94.8%	-	-	-	-	-	-
Integrated Sci. 1	-	-	-	3.4%	-	-	-	-
Integrated Sci. 2	-	-	-	-	-	1.7%	-	-
Integrated Sci. 3	-	-	-	-	-	-	-	-
Earth Science	-	-	-	39.7%	-	1.7%	-	15.5%
Science 10	-	-	-	-	100%	100%	-	-
Physics	-	-	98.6%	41.4%	7.2%	3.4%	-	12.1%
Chemistry	-	-	-	-	92.8%	36.2%	-	31.0%
Biology	-	-	-	12.1%	-	50.0%	100%	36.2%

N=69 students total (Preuss); 58 students total (Comparison).

Section 3: Standardized Test Results by Subject Area

This section provides information on all standardized tests taken by the graduating Class of 2011, Tables 3.1–3.6 show the specific test taken, the year the test was taken, the average scaled score earned by both the Preuss and comparison groups (including the number of students in each group), and the p-value associated with the statistical test performed. Observed p-values less than or equal to 0.05 are statistically significant at conventional levels. As described in the preceding section, results from several of the CST tests could not be analyzed because of small sample sizes.

The difference between the Preuss and Comparison group scale scores was statistically significant on many examinations. In fact, Preuss students were the higher performing group in every instance where a statistically significant result was found; especially robust findings emerged for English Language Arts and in History. The results for Algebra 1, Algebra II and Geometry could not be interpreted, either failing to achieve significance or having sample sizes too small for analyses. In the sciences, Physics and Chemistry test results were unambiguous, with Preuss students clearly performing better on these measures.

Table 3.1 - Class of 2011 Standardized Test Performance, Social Sciences

<i>TEST</i>	<i>PREUSS SCALE SCORE</i>	<i>COMP. SCALE SCORE</i>	<i>P-VALUE</i>
CST 8 th Grade History (2007, 8 th grade)	379 (N=69)	348 (N=56)	<.0001*
CST World History (2008, 9 th grade)	-	-	-
CST World History (2009, 10 th grade)	386 (N=69)	336 (N=50)	<.0001*
CST U.S. History (2010, 11 th grade)	414 (N=69)	364 (N=58)	<.0001*

Table 3.2- Class of 2011 Standardized Test Performance, English Language Arts

<i>TEST</i>	<i>PREUSS SCALE SCORE</i>	<i>COMP. SCALE SCORE</i>	<i>P-VALUE</i>
CAT6 Language Art ^s (2006, 7 th grade)	685 (N=69)	682 (N=58)	0.484
CST English Language Arts (2005, 6 th grade)	383 (N=69)	366 (N=58)	0.007*
CST English Language Arts (2006, 7 th grade)	386 (N=69)	381 (N=57)	0.461
CST English Language Arts (2007, 8 th grade)	382 (N=69)	368 (N=56)	0.046*
CST English Language Arts (2008, 9 th grade)	397 (N=69)	380 (N=57)	0.007*
CST English Language Arts (2009, 10 th grade)	391 (N=69)	368 (N=58)	<0.001*
CST English Language Arts (2010, 11 th grade)	402 (N=69)	376 (N=58)	<0.001*

Table 3.3 - Class of 2011 Standardized Test Performance, Reading & Spelling

<i>TEST</i>	<i>PREUSS SCALE SCORE</i>	<i>COMP. SCALE SCORE</i>	<i>P-VALUE</i>
CAT6 Reading (2006, 6 th grade)	692 (N=69)	680 (N=58)	0.017*
CAT6 Spelling (2006, 6 th grade)	694 (N=69)	684 (N=58)	0.066

Table 3.5 - Class of 2011 Standardized Test Performance, Mathematics

<i>TEST</i>	<i>PREUSS SCALE SCORE</i>	<i>COMP. SCALE SCORE</i>	<i>P-VALUE</i>
CAT6 Mathematics (2006, 7 th grade)	704 (N=69)	689 (N=58)	0.003*
CST Mathematics (2006, 7 th grade)	390 (N=69)	368 (N=58)	0.012*
CST Algebra 1 (2007, 8 th grade)	341 (N=56)	338 (N=48)	0.787
CST Algebra 1 (2008, 9 th grade)	308 (N=2)	310 (N=14)	---
CST Algebra 2 (2008, 8 th grade)	396 (N=13)	365 (N=3)	---
CST Algebra 2 (2009, 10 th grade)	310 (N=42)	295 (N=33)	0.122
CST Algebra 2 (2010, 11 th grade)	283 (N=19)	278 (N=18)	0.674
CST Geometry (2007, 8 th grade)	382 (N=13)	442 (N=1)	---
CST Geometry (2008, 9 th grade)	322 (N=54)	311 (N=40)	0.199
CST Geometry (2009, 10 th grade)	326 (N=15)	296 (N=14)	0.022*
CST Geometry (2010, 11 th grade)	326 (N=1)	246 (N=3)	---
CST H.S. Math (2009, 10 th grade)	376 (N=12)	379 (N=3)	---
CST H.S. Math (2010, 11 th grade)	339 (N=48)	298 (N=30)	0.005*

Table 3.6 - Class of 2010 Standardized Test Performance, Natural Sciences

<i>TEST</i>	<i>PREUSS SCALE SCORE</i>	<i>COMP. SCALE SCORE</i>	<i>P-VALUE</i>
CST Science 8 (2007, 8 th grade)	407 (N=69)	352 (N=55)	<0.001*
CST Science 10 (2009, 10 th grade)	351 (N=69)	349 (N=58)	0.803
CST Earth Science (2008, 9 th grade)	---	336 (N=23)	---
CST Earth Science (2010, 11 th grade)	---	366 (N=9)	---
CST Physics (2008, 9 th grade)	355 (N=68)	325 (N=24)	<0.001*
CST Physics (2009, 10 th grade)	362 (N=5)	337 (N=2)	---
CST Physics (2010, 11 th grade)	---	349 (N=7)	---
CST Chemistry (2009, 10 th grade)	353 (N=64)	319 (N=21)	<0.001*
CST Chemistry (2010, 11 th grade)	---	309 (N=18)	---
CST Biological Sciences (2008, 9 th grade)	---	392 (N=7)	---
CST Biological Sciences (2009, 10 th grade)	---	351 (N=29)	---
CST Biological Sciences (2010, 11 th grade)	377 (N=69)	363 (N=21)	0.121

Section 4: Grade Point Averages and AP Classes

Table 4.1 provides information on the average cumulative weighted and unweighted high school GPA for the Preuss Graduating Class of 2011 and comparison group students. A student's unweighted GPA represents the grades earned for courses taken, without adjustment for course difficulty. A student's weighted GPA takes into account the additional grade point earned for each advanced placement (AP), International Baccalaureate (IB), and honors course taken and passed during high school. Preuss students had higher average unweighted and weighted GPAs relative to control group students and this difference was statistically significant. Beyond statistical significance, the magnitude of the difference is of practical significance, with nearly a half grade point difference in the weighted GPA representing a strong competitive advantage to Preuss students applying to 4-year institutions, relative to students in the comparison group; large enough to impact both eligibility and college choice.

Table 4.1 Class of 2011 Cumulative GPA

<i>ACADEMIC YEAR</i>	<i>PREUSS</i>	<i>COMP.</i>	<i>P-VALUE</i>
Unweighted GPA	3.26	2.96	<0.01*
Weighted GPA	3.51	3.04	<0.01*

N=69 students (Preuss); 58 students (Comparison).

Comparing the average weighted and unweighted GPA's earned by students in their respective groups, it is clear that Preuss students took more AP and honors courses than the comparison group students. The difference in AP course taking was dramatic; Preuss students took, on average, 7.9 AP courses in grades 9-12, versus 2.9 courses for students in the comparison group. This very large difference in AP courses translated into the substantial differences observed in the cumulative weighted GPA. The grade point difference had important practical implications for Preuss students in terms of college eligibility and the choice of which college to attend. Table 4.2 shows the AP class-taking patterns of the Class of 2011. The first column shows the number of students enrolled at each grade level, the second, the average number of AP courses attempted in a given school year, and columns 3-5 the results of the AP examinations. Only students taking and passing AP courses with a grade of "C" or higher were included in these calculations. Preuss students attempted an average of 8.0 AP classes throughout their high school years and scored an average of 2.49 on the corresponding AP examinations. About half of all AP tests taken resulted in a passing score of 3 or above.

Roughly 20% of tests taken resulted in a score of 4 or higher, which, depending on the college or university, could allow students to receive college credit for some or all of these courses.

Table 4.2 Preuss Class of 2011 AP Scores by Academic Year⁸

ACADEMIC YEAR	ENROLLMENT	AP CLASSES ATTEMPTED	AVG SCORE ON AP EXAM	EARNED 3 OR HIGHER	EARNED 4 OR HIGHER
2008 (9 th Grade)	120	0.48	4.00	91.2%	77.2%
2009 (10 th Grade)	112	1.29	2.30	45.1%	18.8%
2010 (11 th Grade)	101	3.02	2.59	52.5%	20.7%
2011 (12 th Grade)	98	3.16	2.20	37.1%	11.6%
Cumulative	---	7.95	2.49	48.0%	20.8%

Enrollment data, by grade and year retrieved from: <http://data1.cde.ca.gov/dataquest/Enrollment/>

Table 4.2.1 expands on Table 4.2 and shows the courses taken by Preuss students during each year of high school, the average score earned and the proportion of students scoring ≥ 3 on each examination. High school freshmen took only the Spanish Language AP course and test and did well, potentially driven in part by the number of households where Spanish was regularly spoken or where Spanish was the primary language. Preuss students did well on the Spanish Literature exam as sophomores, and English Language, Art History, and U.S. History as juniors; more than half of all test takers earned scores ≥ 3 on these subjects. Students fared less well in the STEM related examinations, with less than 40% of Biology, Chemistry and Environmental Science students passing the examinations. Unfortunately, while courses are “flagged” as AP, IB, or honors in the SDUSD data files and are used in the calculation of weighted grade point averages, test scores on the AP examinations are not routinely obtained by the district from The College Board⁹, and we are unable to make a direct comparison between the two groups of students.

Table 4.2.1 Preuss Class of 2011 AP Scores by Academic Year and Exam

YEAR	AP TEST	# TESTS	AVG SCORE	% EARNED ≥ 3	% EARNED ≥ 4
2008	Spanish Language	57	4.0	91.2%	77.2%
2009	European History	94	1.8	28.7%	8.5%
	Spanish Literature	49	3.2	77.6%	38.8%
2010	Art History	70	2.5	54.3%	15.7%
	English Language	98	2.8	59.2%	23.5%
	Spanish Language	28	2.0	28.6%	10.7%
	Statistics	10	2.7	50.0%	20.0%
	US History	98	2.6	52.0%	24.5%

⁸ The CDE also reports AP test-taking patterns across schools, but it does not provide results by grade level. As a result, it is impossible to track the performance of the Class of 2010 across years in this dimension. Individual-level test results are not available at this time.

⁹ The AP examinations are administered by The College Board, an independent agency that creates and administers a variety of test related products, including the AP examinations and the SAT college entrance examinations.

Table 4.2.1 Continued

YEAR	AP TEST	# TESTS	AVG SCORE	% EARNED ≥ 3	% EARNED ≥ 4
2011	Biology	31	1.1	3.20%	3.2%
	Chemistry	31	2.1	38.7%	25.8%
	English Language	97	2.4	41.2%	7.2%
	Environmental Science	29	1.5	10.3%	3.5%
	European History	97	2.6	51.6%	16.5%
	Statistics	11	2.1	36.4%	9.1%

Table 4.3 Class of 2010 AP Classes Attempted by Academic Year

ACADEMIC YEAR	PREUSS	COMPARISON
2007-08 (9 th Grade)	0.48	0.00
2008-09 (10 th Grade)	1.29	0.39
2009-10 (11 th Grade)	3.02	1.14
2010-11 (12 th Grade)	3.16	1.44
Cumulative	7.95	2.97

Section 5: A-G Completion Rates

The University of California and the California State University have jointly determined both the subject areas and number of courses a student must take and pass (with a grade of “C” or better) to be eligible for admission to public four-year institutions in California. Collectively, these requirements are referred to as the “A-G requirements.” Table 5.1 shows each of the subject areas and the minimum and recommended number of years of study required for college eligibility:

Table 5.1 A-G Requirements for CSU and UC Admission

REQUIREMENT	SUBJECT AREA	YEARS OF STUDY REQUIRED
“A”	History / Social Science	2
“B”	English	4
“C”	Mathematics	3 required (4 recommended)
“D”	Laboratory Science	2 required (3 recommended)
“E”	Language other than English	2 required (3 recommended)
“F”	Visual and Performing Arts	1
“G”	Electives	1
All Requirements	Total Years: 15 required, 18 recommended	

For the Class of 2011 we analyzed the courses students had taken using official transcripts from the Preuss School and administrative datasets supplied by SDUSD. Table 5.2 shows the percentage of students in each group completing the A-G requirements. Although many comparison group students in past years came close to completing the required years of study in most subject areas, the “all or none” nature of the A-G requirements drove down the percentage of students graduating with successful A-G completion in that group.

Of the 69 Preuss students, 98.6% completed all A-G requirements successfully. There was only one student not completing A-G (due to mathematics, the “C” requirement). Of the 58 Comparison group students, only 45% completed all A-G requirements successfully. The students who fell short of meeting the requirements often fell short by a substantial degree in

Mathematics and/or English Language Arts, but as a group they made solid gains in completing the other A-G categories.

Table 5.2 Class of 2010 A-G Completion Rates by Requirement

A-G REQUIREMENT	PREUSS % COMPLETE	COMPARISON % COMPLETE
A – History & Social Sciences	100	87.9
B – English Language Arts	100	65.5
C – Mathematics	98.6	69.0
D – Natural Sciences	100	91.4
E – Lang. other than English	100	79.3
F – Visual and Performing Arts	100	96.6
G – Elective	100	94.8
All Requirements	98.6	44.8

N=69 students (Preuss); 58 students (Comparison).

Section 6: High School Exit Exam

The State of California, as a condition of graduation, requires that every student take and pass the California High School Exit Exam (CAHSEE). By the end of the tenth grade, each student is expected to make their first attempt to take and pass the two sections of the CAHSEE: Mathematics and English. These sections may be taken and passed individually, with retakes allowed until the student passes. All students in the Preuss group had taken and passed both portions of the examination by the end of 10th grade. In the comparison group, all but two students passed both portions of the exam in 10th grade; of these two students, one passed mathematics on a subsequent attempt and one failed to pass the mathematics exam by the spring of 2011. Table 6.1 is presented for comparison purposes and reports on the 10th grade attempt and pass rate for all test takers in California and the County of San Diego.

Table 6.1 San Diego County & California 10th Grade CAHSEE Performance 2000 & 2010

Year	Location	Tested or Passing	Subject	All Students	English Learner (EL) Students	Reclassified Fluent-English Proficient (RFEP) Students	Economically Disadvantaged	Not Economically Disadvantaged
2009	Countywide	# Tested	Math	37,662	6,365	6,783	16,522	18,182
		Passing		31,728 (84%)	3,562 (56%)	6,295 (93%)	12,449 (75%)	16,818 (92%)
		# Tested	ELA	38,077	6,476	6,783	16,757	18,312
		Passing		31,367 (82%)	2,678 (41%)	6,340 (93%)	11,951 (71%)	16,919 (92%)
	Statewide	# Tested	Math	474,327	75,613	89,345	235,179	194,204
		Passing		378,440 (80%)	39,788 (53%)	80,488 (90%)	168,834 (72%)	173,339 (89%)
# Tested		ELA	476,830	76,649	89,222	236,510	195,176	
Passing			377,693 (79%)	30,927 (40%)	81,519 (91%)	164,752 (70%)	176,018 (90%)	
2010	Countywide	# Tested	Math	37,723	5,896	7,028	17,413	18,126
		Passing		32,014 (85%)	3,232 (55%)	6,560 (93%)	13,412 (77%)	16,782 (93%)
		# Tested	ELA	38,144	6,032	7,045	17,671	18,258
		Passing		31,518 (83%)	2,401 (40%)	6,602 (94%)	12,832 (73%)	16,893 (93%)
	Statewide	# Tested	Math	475,452	72,176	95,680	247,693	189,786
		Passing		383,887 (81%)	37,693 (52%)	86,912 (91%)	181,974 (73%)	170,942 (90%)
		# Tested	ELA	478,099	73,021	95,712	249,129	190,779
		Passing		385,196 (81%)	30,457 (42%)	88,554 (93%)	180,062 (72%)	173,775 (91%)

Section 7: College Entrance Examinations and College Enrollment

Table 7.1 provides the average scores earned, by decile, for the 2011 Preuss graduates compared against the SDUSD, San Diego County, and California statewide averages on the examinations.¹⁰ Three points are worth additional comment. The first is that the “percent tested” reported by the CDE is computed by dividing the total number of test scores recorded by the 12th grade enrollment; for example, the number of SAT scores recorded in the State of California is divided by the number of 12th grade students in the State to give us the State percentage tested. What this means is that for every student who makes more than one attempt at these examinations, the reported “percent tested” goes up. Unfortunately, because the number of attempts made by students is not reported or accounted for on the CDE websites, we cannot estimate the degree to which multiple attempts are inflating the percentages reported – only that the actual participation rate is lower than stated.

The second issue is also a function of the information reported by the CDE. The data reported does not isolate the “best score” achieved by each student attempting the tests more than once. Typically, college admissions offices look at the “best” single testing session recorded by a student and use that composite score in admission decisions. For example, a student taking the SAT’s twice with composite scores of 1550 and 1480 would have the score of 1550 used in the admission decision and the score of 1480 would be ignored. What this means is that we can’t do a direct “apples to apples” comparison of Preuss SAT performance relative to that of students attending other schools in the same way that admission offices would view that data.

The third has to do with Preuss School policy, which requires all students to take the SAT’s. This has the unintended consequence of creating an unreasonable basis of comparison, working against the Preuss School. If we simply compare the average score earned by Preuss students against those earned by students attending other schools, the comparison is 100% of Preuss students versus a *self-selected* subset of students attending other schools. Using data contained in table 7.1, we see that in the San Diego Unified School District, the CDE reports that about 48% of students take the SAT. The problem is that students in that 48% are not representative of all students in the district and a reasonable conclusion is that the 48% is comprised of college bound seniors, in the upper half of their graduating classes in terms of GPA and AG courses taken. Had all students in the district been required to take the SAT, as is the case with Preuss students, the average score reported would have been considerably lower than the average reported. How much lower? That’s impossible to determine with the data available. Rather than impose our “guess” about what constitutes a reasonable comparison, we present the average scores of Preuss students by deciles, and allow the reader use their own judgment about what proportion of Preuss test takers represent an “apples to apples” comparison to a particular school or district.

The averages presented in the decile row were calculated by using the single best testing session recorded by a student, the same value used by UC and CSU admissions offices. We also computed the participation rate and average score of *all attempts* by collapsing across the 201 individual test scores recorded by Preuss students, in the same manner as the CDE.

¹⁰ Obtained from the California Department of Education website (<http://data1.cde.ca.gov/dataquest/>).

Table 7.1 Preuss Class of 2010 SAT I and II Scores¹¹ (Composite=Mathematics + English + Writing)

DECILE	ALL	90	80	70	60	50	40	30	20	10
PREUSS	1621	1656	1685	1715	1748	1786	1827	1875	1930	2007
	Testing Rate			Average Score						
Preuss ¹² Best Attempt	99.00%			1621						
Preuss All Attempts ¹³	205.00%			1582						
SDUSD	48.07%			1478						
COUNTY	39.26%			1531						
STATE	37.95%			1502						

For the Class of 2011, the average score of the Preuss test takers was higher than that recorded by students in the district and state¹⁴; using the more conservative *all attempts* value of 1582, Preuss students still scored higher than students in the district – by more than 100 points.

The scores earned on the SAT's are indicators of academic proficiency and are not the sole determinants of college acceptance. When combined with weighted GPA and completion of the A-G requirements, these indicators determine a large portion of the competitive standing of the college applications made by each graduate. Table 7.2 shows the number and percentage of Preuss graduates in the Class of 2011 submitting a Statement of Intent to Register (SIR) to each segment of higher education, compiled by the Preuss School Registrar's Office. The SIR is not a perfect predictor of college enrollment, because students can (and do) change their mind even after they notify a college of their enrollment plans.

This table shows that 80.6% of the graduating class intended to enroll in 4-year colleges and universities in the fall of 2011 and 18% planned on enrolling at community colleges. The University of California (as well as CSU system) allows students enter the UC as juniors after completing 2 years of approved community college course work. It is expected that many of the Preuss graduates attending community colleges will eventually transfer to either the UC or CSU campuses to complete their four-year degrees.

Table 7.2 Preuss Class of 2011 SIR by higher education segment

	NUMBER OF STUDENTS	PERCENT OF CLASS
UC	30	30.61%
CSU	20	20.41%
Private or out of State public	29	29.60%
Total 4-Year College	79	80.62%
Community College	18	18.37%
Unknown	1	1.02%
Total	98	100.00%

¹¹ Average scores and percent of students taking the SAT 1 for the SDUSD, County, and State were obtained from the CDE website.

¹² A single student did not have a score reported. Included in this analysis are the 97 (of 98) students who did records a score.

¹³ The average reported under "all attempts" includes all test scores recorded by Preuss students in the Class of 2011. A total of 201 tests were recorded, indicating that, on average Preuss students took the exam twice (2.05 attempts)

¹⁴ We compare to "district, county, and State averages" rather than the comparison group because the district does not collect information on college entrance examinations. For that reason a direct comparison is not possible.