UMASS DONAHUE INSTITUTE • APPLIED RESEARCH & PROGRAM EVALUATION

Massachusetts Statewide STEM Indicators Project (MASSIP)

2014 Massachusetts STEM Data Dashboard

Presented to the Massachusetts Department of Higher Education's STEM Pipeline Program and the Massachusetts Governor's STEM Advisory Council.

June 2014

Contents

Introduction

The Massachusetts Mathematics, Science, Technology & Engineering Grant (Pipeline) Fund was established under the Acts of 2003 Economic Stimulus Trust Fund. The Massachusetts Department of Higher Education (DHE) was directed to administer the Pipeline Fund, with a focus on three goals:

(1) to increase the number of Massachusetts students who participate in programs that support careers in fields related to mathematics, technology, engineering, and science;
(2) to increase the number of qualified mathematics, technology, engineering, and science teachers in the Commonwealth; and,
(3) to improve the mathematics, technology, engineering, and science educational offerings available in public and private schools.

The DHE created Regional PreK–16 Networks to plan and implement teacher and student activities that address the Pipeline Fund's goals. In addition, the DHE contracted with the University of Massachusetts Donahue Institute to develop a statewide science, technology, engineering, and mathematics (STEM) indicators system that would serve to benchmark Massachusetts' progress in key educational and economic areas associated with the Pipeline Fund's goals.

Recognizing the vast number of initiatives in place across Massachusetts to address STEM educational issues, this indicators system is not intended to specifically evaluate the impact of those activities directly supported by the Pipeline Fund. Rather, it serves as a reflection of the overall state of the combined efforts across the Commonwealth to increase the "flow" of students through a STEM educational "pipeline." Indicators' reports provide a basis for charting the Commonwealth's progress as a whole in promoting STEM education at all levels.

The purpose of the Massachusetts Statewide STEM Indicators Project (MASSIP) is to collect, analyze, and present a set of measurements that reflect a range of educational and economic conditions that are indicative of the state of the Massachusetts STEM Pipeline. Data collected in support of MASSIP are to be publicly available, be free of charge, and meet four criteria:

A. Be Focused: Each indicator should speak directly to Massachusetts' educational and workforce status in STEM-related areas.
B. Be Meaningful: Data should be useful to a wide variety of audiences and purposes.
C. Be Accessible: Data should be available at no cost through currently existing secondary sources.
D. Be Perennial: Data should be consistently available on an annual (or other cyclical) basis.

Please note that MASSIP uses a broad definition of STEM that incorporates all of the following subject/ employment areas: (1) Agriculture, Conservation, and Natural Resources, (2) Architecture, (3) Biological and Biomedical Sciences, (4) Computer and Information Sciences, (5) Engineering and Engineering Technologies/Technicians, (6) Health Professions and Clinical Sciences, (7) Mathematics and Statistics, (8) Mechanic and Repair Technologies/Technicians, (9) Military Technologies/Technicians, (10) Physical Sciences, (11) Precision Production, and (12) Science Technologies/Technicians. As a result, data from MASSIP may not be comparable to data from other sources that use a different definition of STEM.

In 2009, MASSIP evolved to focus on the five Quantitative STEM Goals central to the Commonwealth's Statewide STEM Plan. The intention of these Goals was threefold: (1) to help focus state initiatives as well as

stakeholders in general, (2) to help inform policy at state, regional, and local/school levels, and (3) to help inform in-depth research. In selecting the indicators for the Plan, the following were taken into consideration:

I. That data associated with the Goals should, at a minimum, be able to be tracked at state and regional levels and, ideally, also at the local or district/school level;
II. That data should be able to be tracked for the total group (e.g., "all students" or "all employed persons") and, ideally, also for major subgroups, including by gender, race/ethnicity, and/or income;
III. That data for each Goal should track both progress of the whole group toward a statewide target, as well as gaps that may or may not exist between different subgroups;
IV. That data associated with the Goals should cover a minimum of five years in order to facilitate trend analysis; and,
V. That the Goals should be a living system—to be updated if/when improved data are available.

The following report represents the latest iteration of data presentation related to MASSIP and the Statewide STEM Goals. Information about the data associated with each chart/indicator can be found at the end of this report (in the "Data Notes" section).

State STEM Goals

The Massachusetts State STEM Plan has five quantitative goals associated with it. These goals were originally developed as part of the Commonwealth's first Statewide STEM Plan 1.0 in 2010. They were then updated as part of the Statewide STEM Plan 2.0 in 2013. To see the full Statewide STEM Plan 2.0 please go to:

http://www.mass.edu/stem/documents/2013-11MassachusettsSTEMPlan2.0.pdf

Below are the current formulations of the five goals.

Goal 1: Increase student interest in STEM areas.

Benchmark: Increase interest in STEM college majors among college-going MA public school graduates from 35% in 2009 to 45% by 2016.

Priority Areas:
(1) Break through the interest gap: Increase interest among the underrepresented gender and underrepresented races/ethnicities in fields where data indicate interest gaps.
(2) Highlight STEM career opportunities: Increase interest in fields where STEM knowledge and skill are expected to expand across occupations/industries in the future.

Goal 2: Increase student achievement among all PreK–12 students in order to prepare graduates to be civically and college and/or career ready.

Benchmark: Increase the percentage of all students who score proficient or advanced on the MCAS mathematics and science and technology/engineering assessments by 20 points by 2016.

Priority Areas:
(1) Increase exposure:
- Increase the percentage of schools that require three years of science and four years of mathematics for graduation, in accordance with MassCORE, to 100%.
- Increase the percentage of elementary students who receive at least three hours of science per week from 32% in 2009 to 50% by 2016.
- Increase the percentage of students who report taking advanced mathematics (pre-calculus or higher) from X% to Y% as reported to DESE by schools.
- Increase the percentage of students who take at least one technology, computing, or engineering based course between grades 7 and 12 from X% to Y%.

(2) Increase proficiency:
- Increase the percentage of all 5th and 8th grade students scoring proficient or advanced on mathematics and science and technology/engineering MCAS assessments by 20 percentage points between 2009 and 2016.
- Increase the percentage of all students scoring proficient or advanced on high school MCAS assessments in mathematics and science and technology/engineering assessment by 15 points between 2009 and 2016.
- Reduce the percentage of recent high school graduates who require remedial or developmental mathematics courses at community colleges from 57% to 45% by 2016.

- Reduce the percentage of recent high school graduates who require remedial or developmental mathematics courses at publically funded state universities from 18% to 10% by 2016.

(3) Reduce the achievement gap: Reduce the achievement gaps for race, special needs, ELL, SES, and gender in 5th grade, 8th grade, and high school students on the mathematics and science and technology/engineering MCAS assessment by 25 percentage points between 2010 and 2016.

Goal 3: Increase the percentage of skilled educators who teach PreK–16 STEM classes.

Benchmark: Increase the number/percentage of STEM classes led by skilled educators from PreK–16 by 2016.

Priority Areas:

(1) Early Childhood Educators:
- Increase the number and percentage of certified or credentialed early education providers.
- Increase the percentage of early childhood providers who follow the Massachusetts Early Childhood Science, Technology, and Engineering Standards.
- Increase the number of hours early childhood educators report taking STEM-focused professional development.
- Increase the percentage of early educators who are trained on QRIS and implement the science, technology, and engineering standards after ratification.

(2) Elementary Educators:
- Increase pass rates of K–5 educators on the mathematics subtest of the elementary Massachusetts Tests for Educator Licensure (MTEL).
- Encourage K–5 educators to become certified in science.
- Increase number of STEM teacher practitioner programs, as measured by an increase in specific elementary mathematics and science methods courses.
- Increase the number of students enrolled in STEM teacher practitioner programs.
- Increase the number of hours PreK–5 teachers report taking STEM

(3) Secondary Educators:
- Increase the percentage of STEM secondary educators rated exemplary or proficient in the Massachusetts Educator Evaluation system.
- Increase the percentage of STEM secondary teachers with at least five years of experience who move from being rated proficient to exemplary.
- Increase student achievement growth rates. This factor is locally determined by the school district and is reported as part of the Educator Evaluation Tool.
- Increase MTEL pass rates for STEM subject tests.
- Increase the number of STEM educators with multiple STEM certifications and in the number of technology/engineering endorsements granted.
- Decrease the number and percent of waivers for teachers teaching STEM who do not have an appropriate STEM license.

(4) Post-Secondary Educators:
- Increase the percentage of faculty members who report that they participate in professional development on annual faculty reviews.
- Use professional development participation for tenure review decisions.
- Increase in retention rates of students in freshman STEM courses.
- Increase the number of PreK–12 teachers who are deemed exemplary or proficient that come out of MA teacher practitioner programs.

(5) Out-of-School Time (OST) Educators.
- Increase the number of professional development hours OST providers spend in STEM-based training.
- Increase the number of hours OST programs report on providing STEM support.

Goal 4: Increase the percentage of students completing post-secondary degrees or certificates in STEM subjects.

Benchmark: Increase the percentage of students who complete STEM-related post-secondary degrees and certificates at public and private institutions by 50% from 2008 to 2016.

Priority Areas:

(1) Increase and support STEM post-secondary credential attainment:
- Increase the percentage of bachelor's degrees awarded in STEM fields from 23% in 2009 to be 50% of all degrees awarded in 2016. Increase the percentage of associate's degrees and "less-than-bachelor's" certificates in STEM fields by 50% by 2015.
- Inform students of local or regional vocational and technical education programs to increase access and awareness of STEM career opportunities.

(2) Bridge the credential attainment gap:
- Increase the percentage of bachelor's and associate's degrees in STEM majors granted from 4% to 10% for African-Americans and from 4% to 10% for Latinos of all STEM degrees conferred.
- Increase the percentage of computer science and engineering bachelor's degrees earned by women from 17% to 25% in computer science and from 23% to 35% in engineering.
- Increase the percentage of health science degrees earned by men from 15% to 25%.

Goal 5: STEM degrees and certificate attainment will be aligned with corresponding opportunity in STEM-related fields to match the state's workforce needs for a STEM talent pipeline.

Benchmark: No less than 50% of degrees (associate's, bachelor's, and Ph.D.) and certificates earned will provide transferrable knowledge, skills, and work habits for entry into STEM-enabled occupations, ensuring the supply of talent will meet demands of the Massachusetts economy.

Priority Areas:

(1) Robust STEM post-secondary preparation for STEM careers:
- Double the number of degrees in Computer and Information Science earned from 4% of degrees to 8%.
- Increase certificates and degrees earned in biology and healthcare to 18% of degrees by 2016.
- Increase Asian, Latino and African-American college STEM student participation in internships, co-op, practicum, or clinical experiences to equal the average for all New England students (61%).
- Increase proportion of Massachusetts students who score on par with their national peers on the Deep Learning Scale in all STEM fields, as measured by the National Survey of Student Engagement.

(2) Build a diverse innovation workforce:

- Diversify the workforce in STEM occupations to mirror the diversity of the Massachusetts workforce. Increase African-American and Latino employment in STEM jobs from 12% to 15% of STEM employment.
- Increase women employed in engineering, computer science, and information technology careers from 13% and 27% of employment to 40%.
- Increase the number of workforce retraining programs focused on STEM.

Goal 1 Indicators: Student Interest in STEM

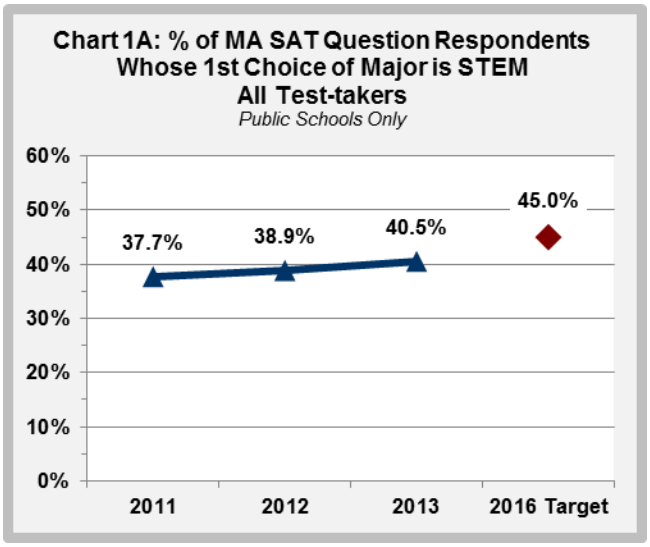
Chart 1A: % of MA SAT Question Respondents
Whose 1st Choice of Major is STEM
All Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
37.7%
38.9%
40.5%
45.0%
2011
2012
2013
2016 Target

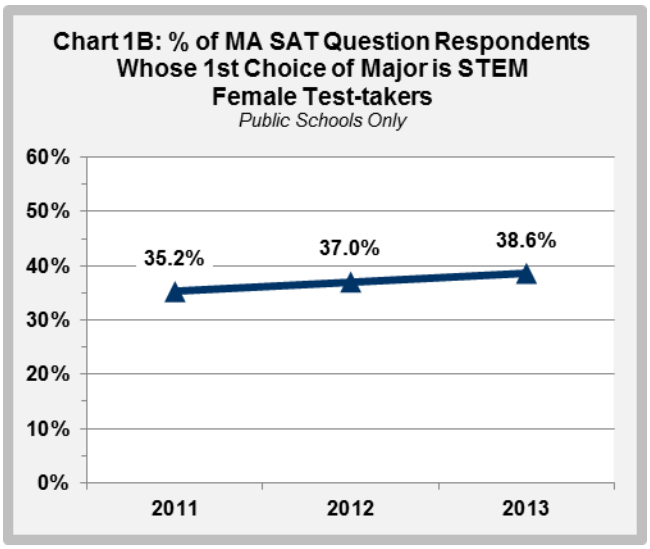
Chart 1B: % of MA SAT Question Respondents
Whose 1st Choice of Major is STEM
Female Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
35.2%
37.0%
38.6%
2011
2012
2013

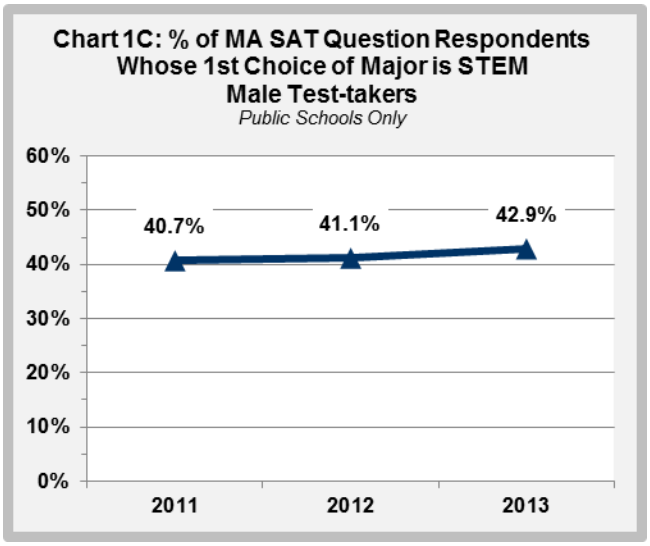
Chart 1C: % of MA SAT Question Respondents
Whose 1st Choice of Major is STEM
Male Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
40.7%
41.1%
42.9%
2011
2012
2013

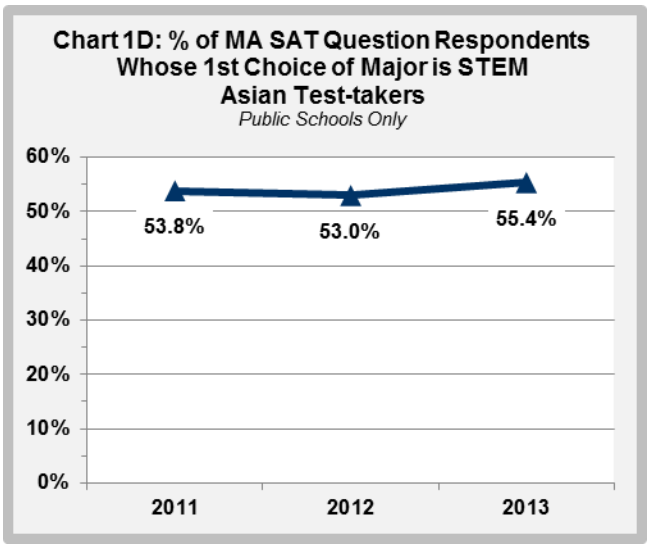
Chart 1D: % of MA SAT Question Respondents
Whose 1st Choice of Major is STEM
Asian Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
53.8%
53.0%
55.4%
2011
2012
2013

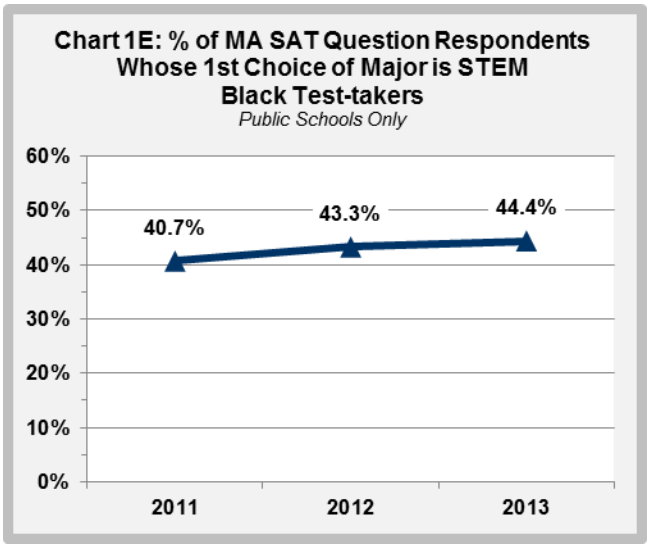
Chart 1E: % of MA SAT Question Respondents
Whose 1st Choice of Major is STEM
Black Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
40.7%
43.3%
44.4%
2011
2012
2013

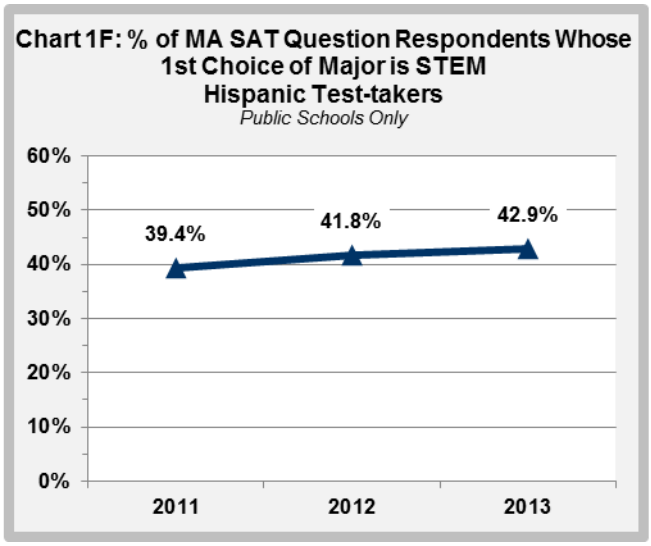
Chart 1F: % of MA SAT Question Respondents Whose 1st Choice of Major is STEM
Hispanic Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
39.4%
41.8%
42.9%
2011
2012
2013

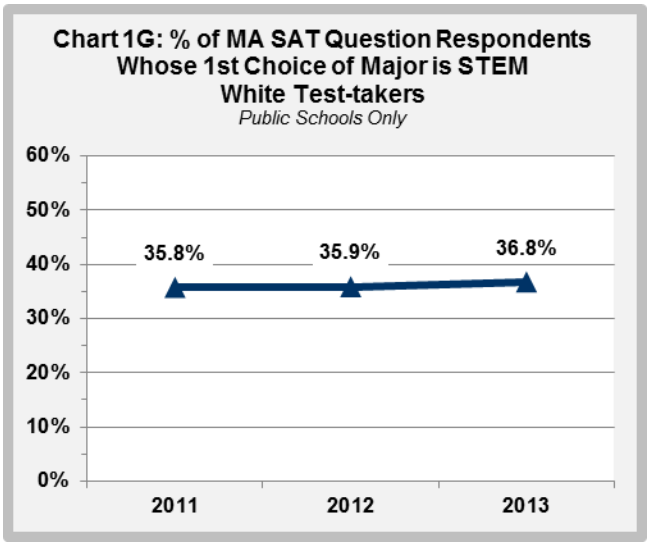
Chart 1G: % of MA SAT Question Respondents Whose 1st Choice of Major is STEM
White Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
35.8%
35.9%
36.8%
2011
2012
2013

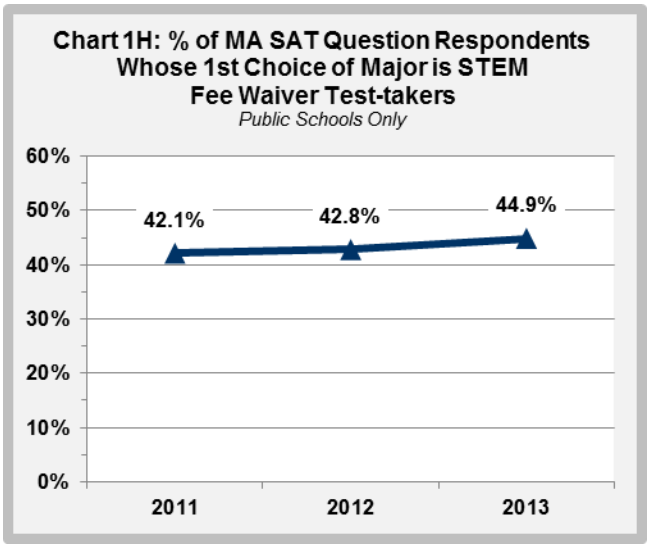
Chart 1H: % of MA SAT Question Respondents Whose 1st Choice of Major is STEM
Fee Waiver Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
42.1%
42.8%
44.9%
2011
2012
2013

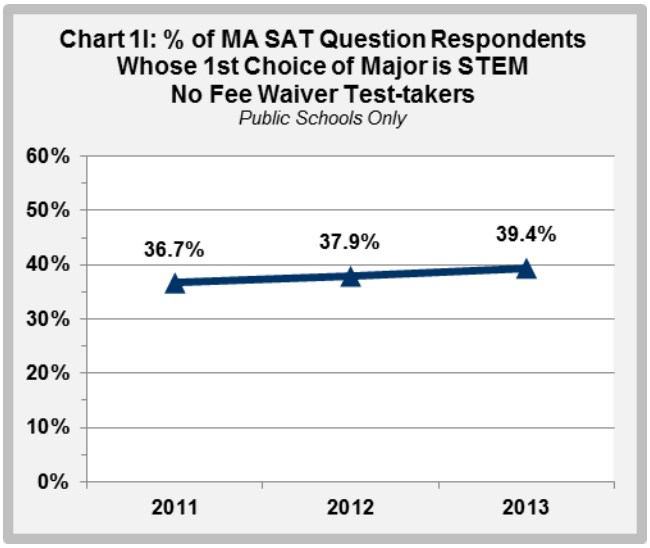
Chart 1I: % of MA SAT Question Respondents Whose 1st Choice of Major is STEM
No Fee Waiver Test-takers
Public Schools Only
60%
50%
40%
30%
20%
10%
0%
36.7%
37.9%
39.4%
2011
2012
2013

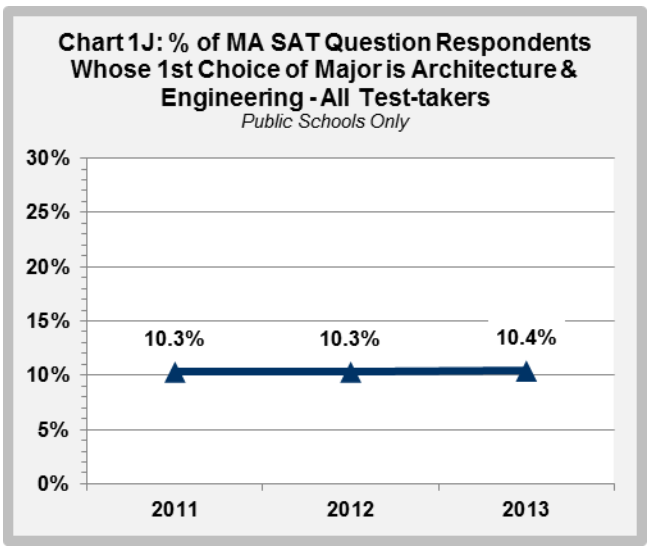
Chart 1J: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering - All Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
10.3%
10.3%
10.4%
2011
2012
2013

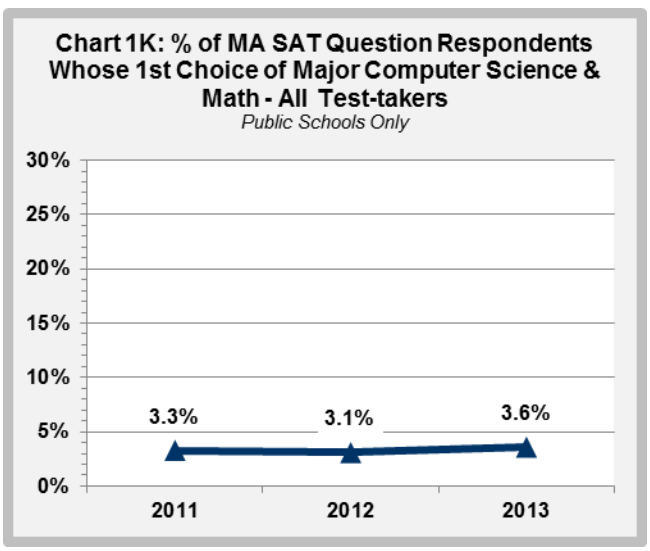
Chart 1K: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - All Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
3.3%
3.1%
3.6%
2011
2012
2013

Chart 1L: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - All Test-takers
Public Schools Only

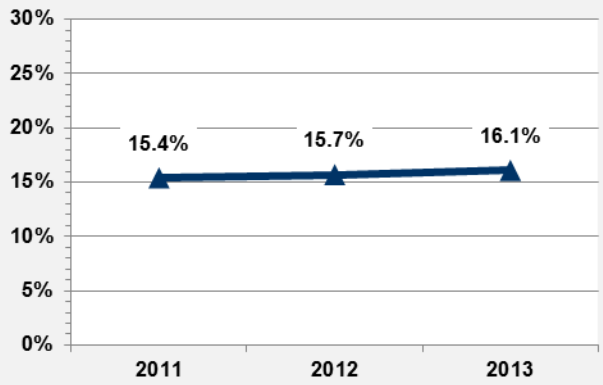

Chart 1M: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - All Test-takers
Public Schools Only

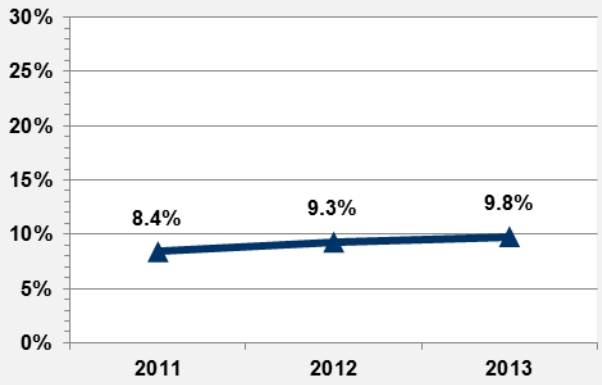

Chart 1N: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering - Female Test-takers
Public Schools Only

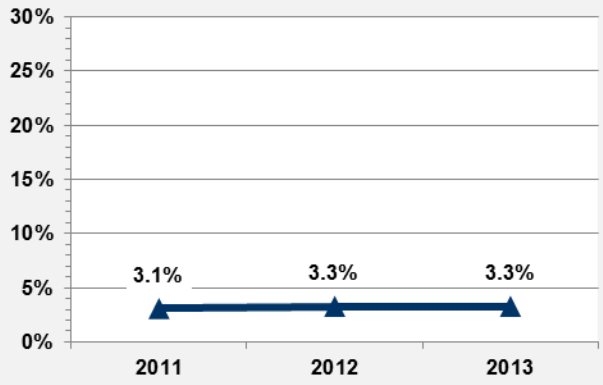

Chart 1O: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - Female Test-takers
Public Schools Only

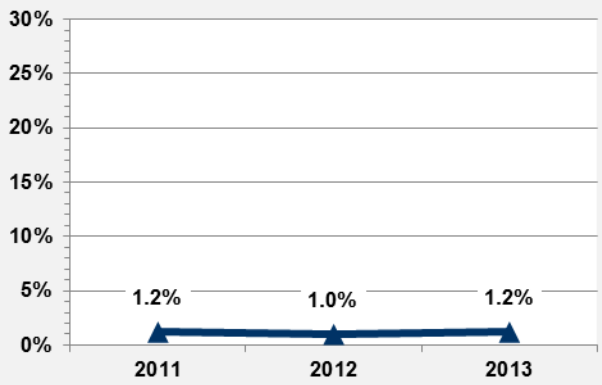

Chart 1P: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - Female Test-takers
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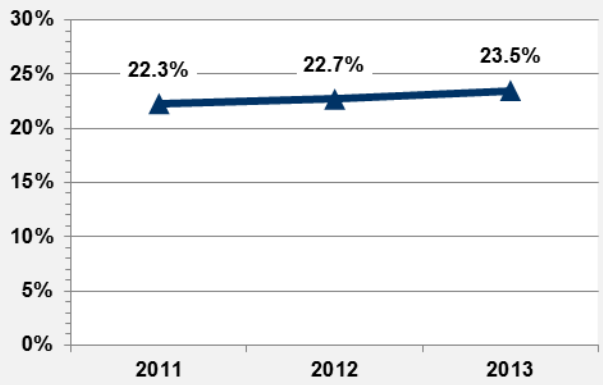
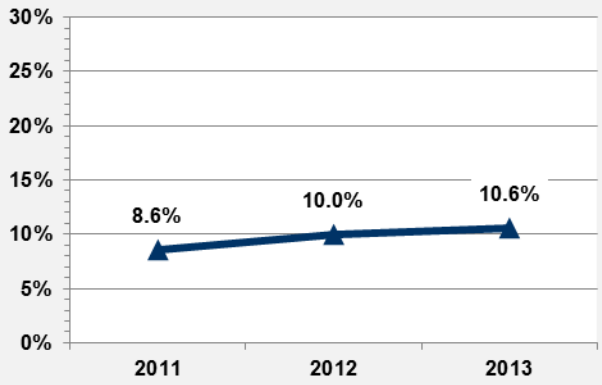


Chart 1Q: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - Female Test-takers
Public Schools Only



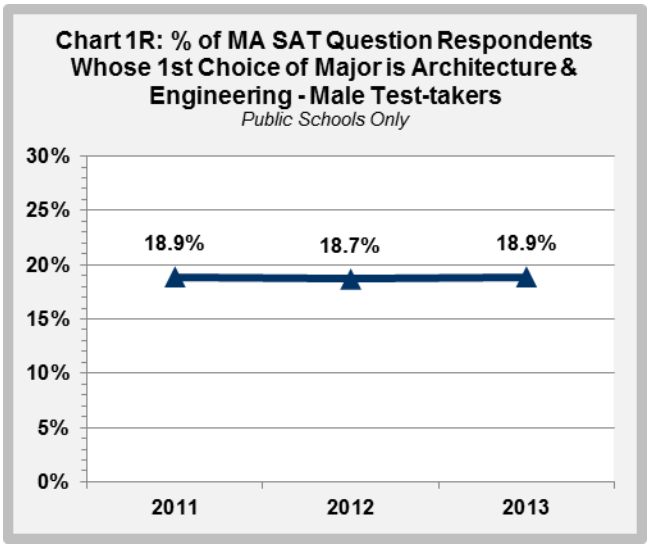


Chart 1R: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering - Male Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
18.9%
18.7%
18.9%
2011
2012
2013

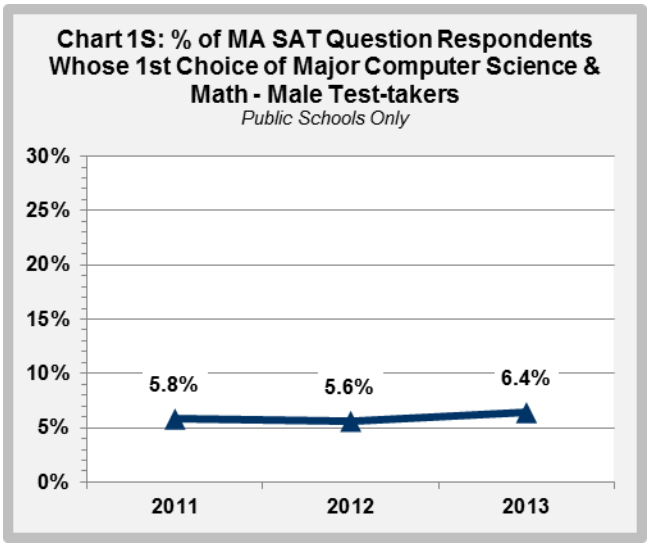


Chart 1S: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - Male Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
5.8%
5.6%
6.4%
2011
2012
2013

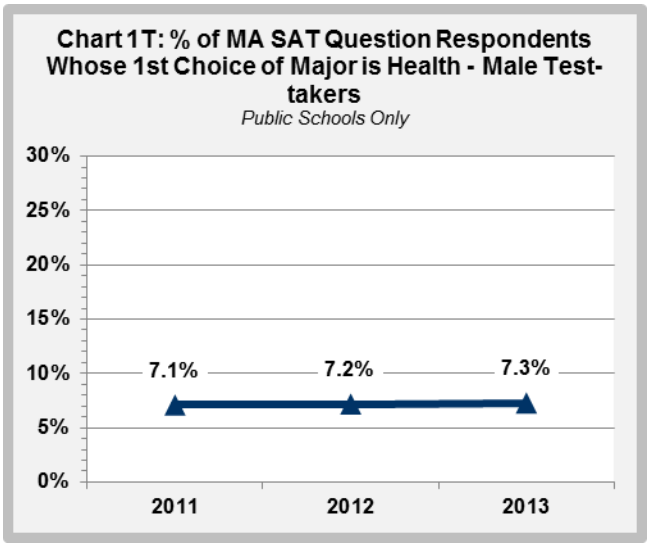


Chart 1T: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - Male Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
7.1%
7.2%
7.3%
2011
2012
2013

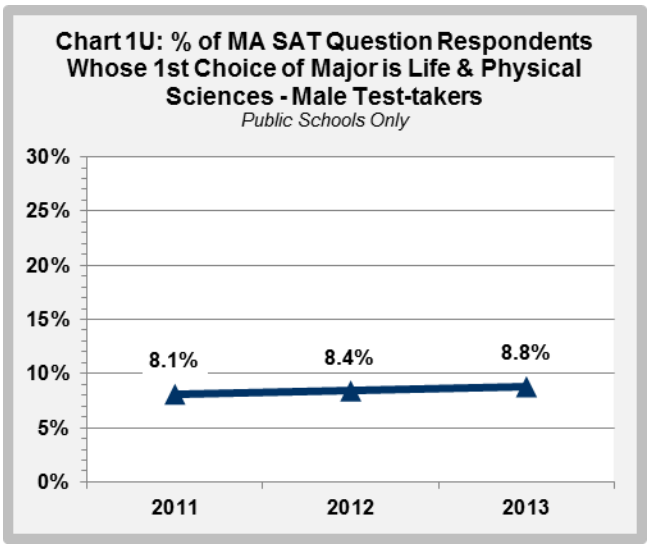


Chart 1U: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - Male Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
8.1%
8.4%
8.8%
2011
2012
2013

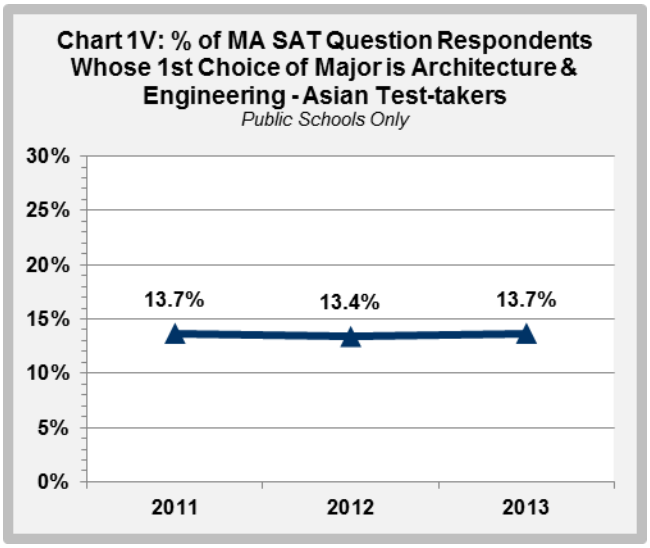


Chart 1V: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering - Asian Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
13.7%
13.4%
13.7%
2011
2012
2013

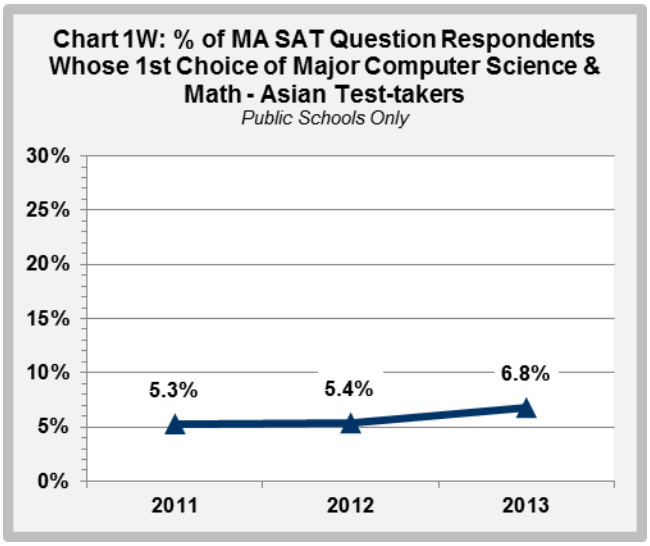


Chart 1W: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - Asian Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
5.3%
5.4%
6.8%
2011
2012
2013

Chart 1X: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - Asian Test-takers

Public Schools Only

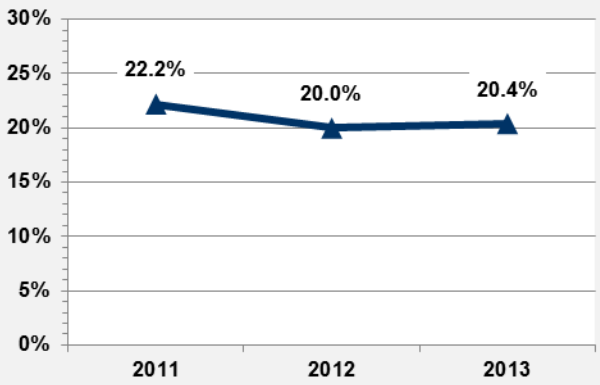


Chart 1Y: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - Asian Test-takers

Public Schools Only

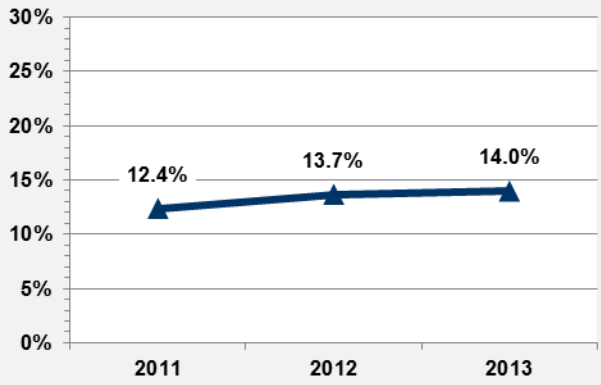


Chart 1Z: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering- Black Test-takers

Public Schools Only

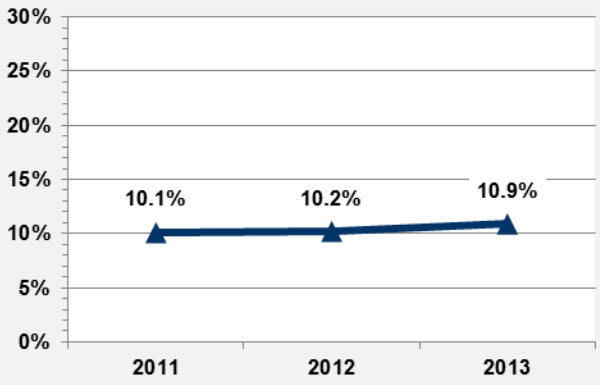


Chart 1AA: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - Black Test-takers

Public Schools Only

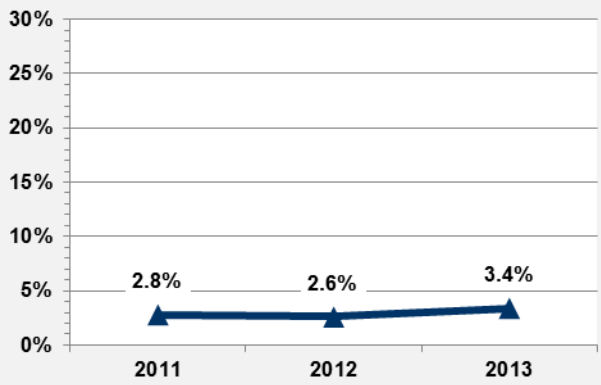


Chart 1BB: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - Black Test-takers

Public Schools Only

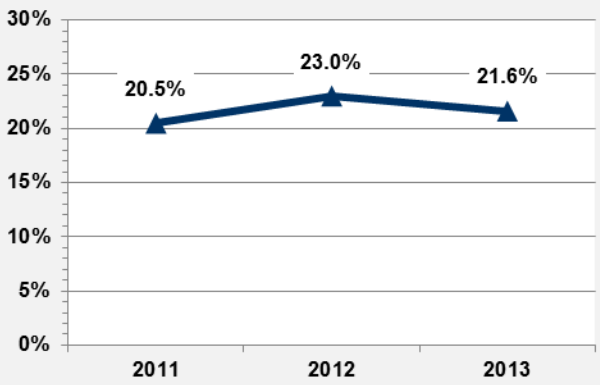


Chart 1CC: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - Black Test-takers

Public Schools Only

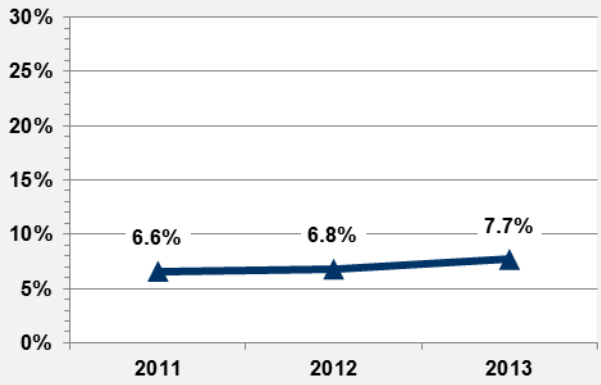


Chart 1DD: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering - Hispanic Test-takers
Public Schools Only

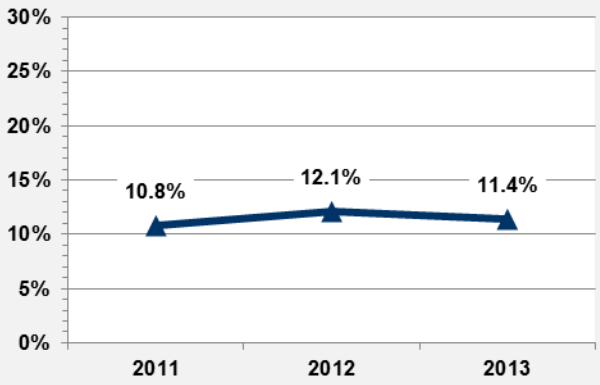


Chart 1EE: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - Hispanic Test-takers
Public Schools Only

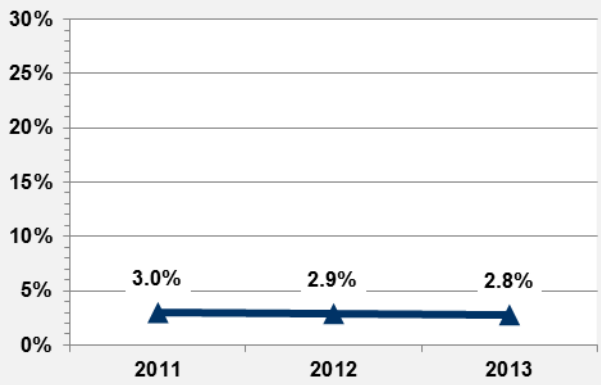


Chart 1FF: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - Hispanic Test-takers
Public Schools Only

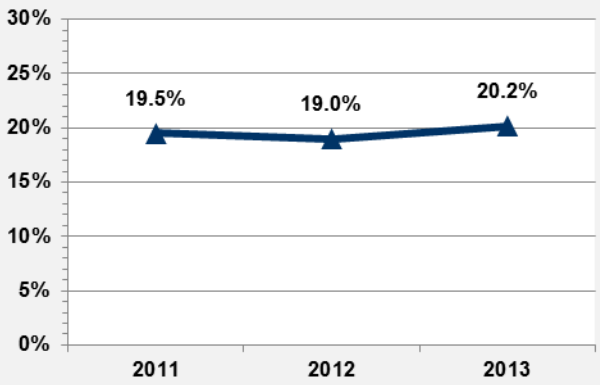


Chart 1GG: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - Hispanic Test-takers
Public Schools Only

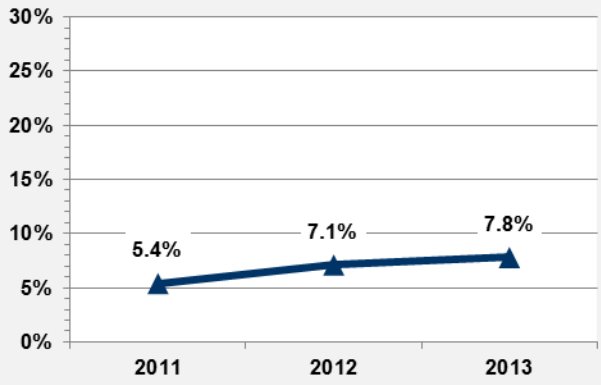


Chart 1HH: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering - White Test-takers
Public Schools Only

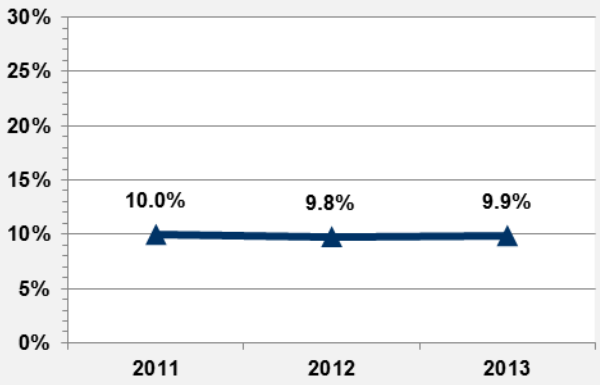
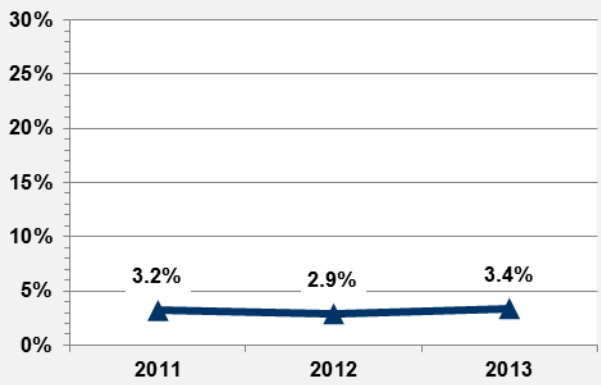


Chart 1II: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - White Test-takers
Public Schools Only



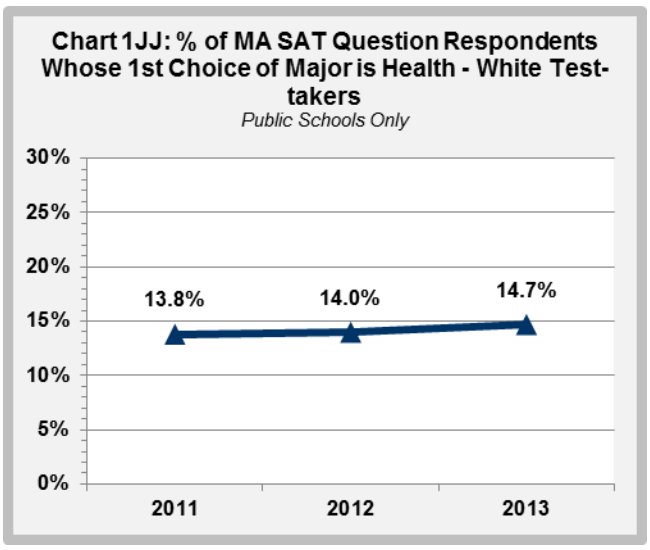


Chart 1JJ: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - White Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
13.8%
14.0%
14.7%
2011
2012
2013

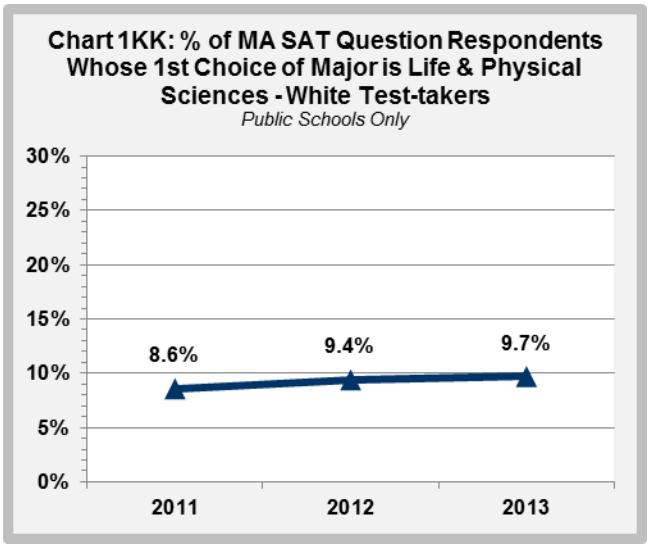


Chart 1KK: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - White Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
8.6%
9.4%
9.7%
2011
2012
2013

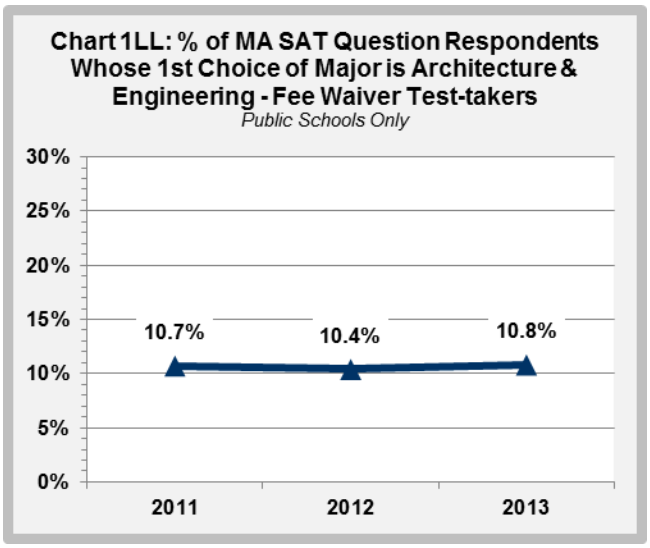


Chart 1LL: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering - Fee Waiver Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
10.7%
10.4%
10.8%
2011
2012
2013

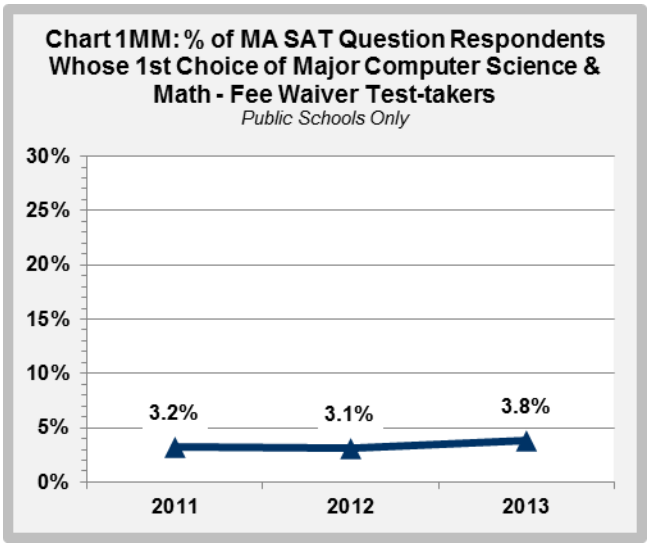


Chart 1MM: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - Fee Waiver Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
3.2%
3.1%
3.8%
2011
2012
2013

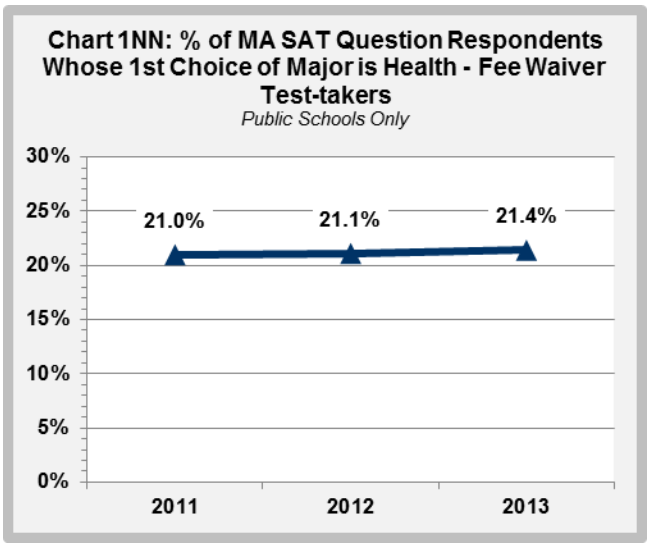


Chart 1NN: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - Fee Waiver Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
21.0%
21.1%
21.4%
2011
2012
2013

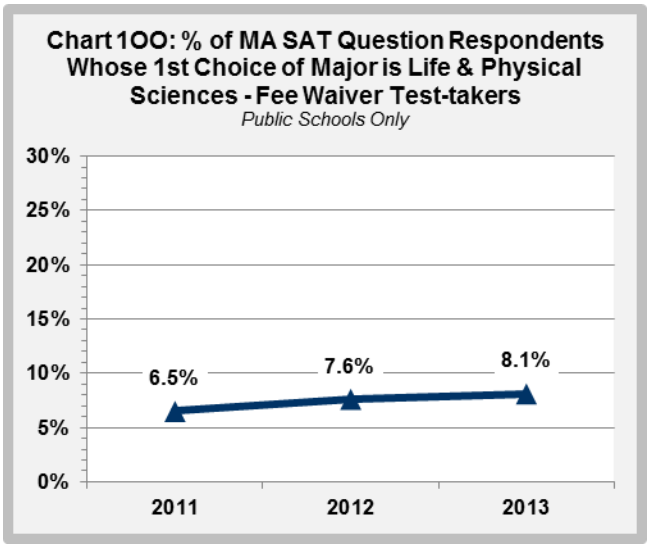


Chart 1OO: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - Fee Waiver Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
6.5%
7.6%
8.1%
2011
2012
2013

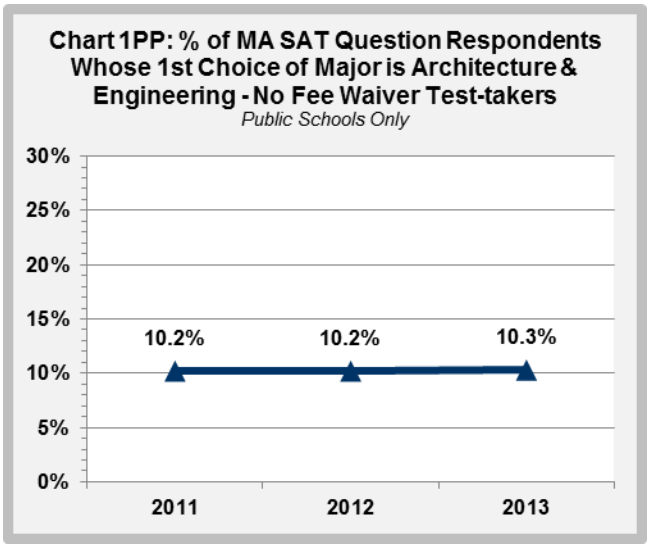


Chart 1PP: % of MA SAT Question Respondents Whose 1st Choice of Major is Architecture & Engineering - No Fee Waiver Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
10.2%
10.2%
10.3%
2011
2012
2013

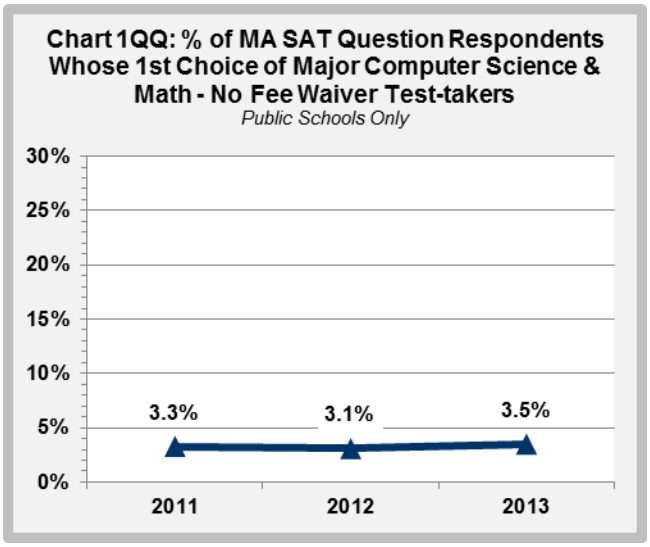


Chart 1QQ: % of MA SAT Question Respondents Whose 1st Choice of Major Computer Science & Math - No Fee Waiver Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
3.3%
3.1%
3.5%
2011
2012
2013

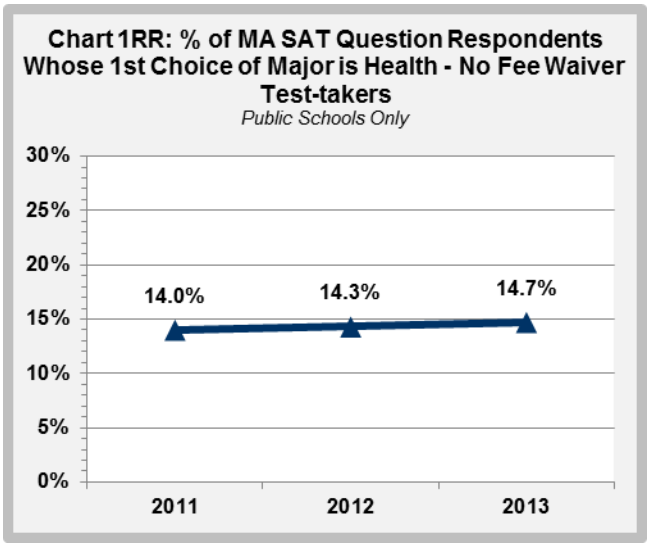


Chart 1RR: % of MA SAT Question Respondents Whose 1st Choice of Major is Health - No Fee Waiver Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
14.0%
14.3%
14.7%
2011
2012
2013

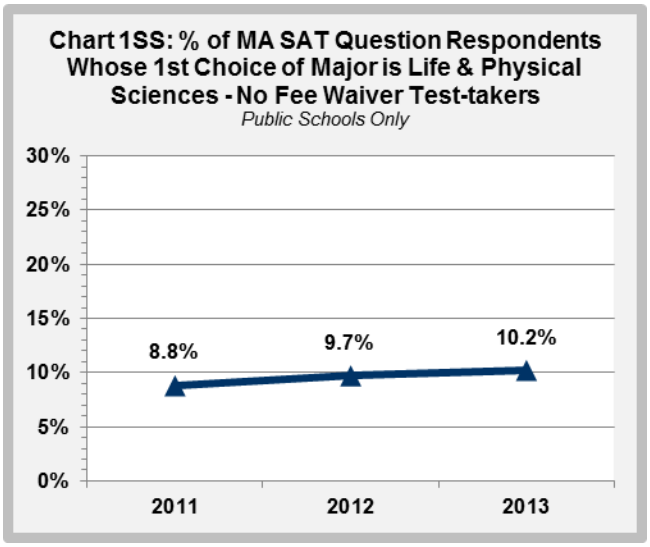


Chart 1SS: % of MA SAT Question Respondents Whose 1st Choice of Major is Life & Physical Sciences - No Fee Waiver Test-takers
Public Schools Only
30%
25%
20%
15%
10%
5%
0%
8.8%
9.7%
10.2%
2011
2012
2013

Goal 2 Indicators: Student Achievement in STEM

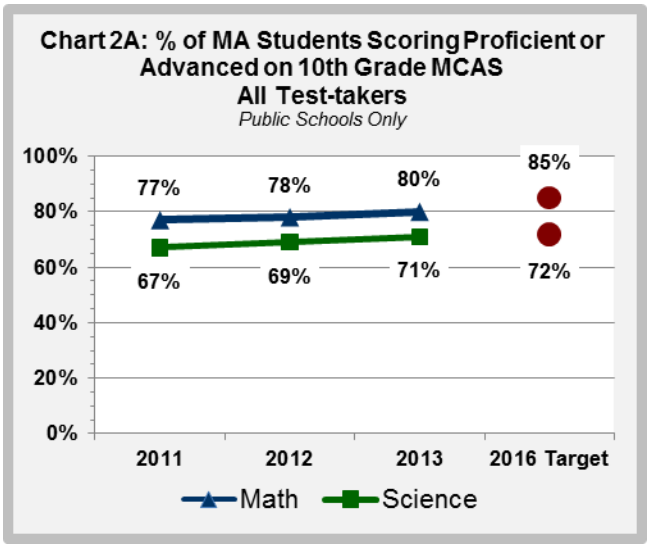


Chart 2A: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS
All Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
77%
78%
80%
85%
67%
69%
71%
72%
2011
2012
2013
2016 Target
Math
Science

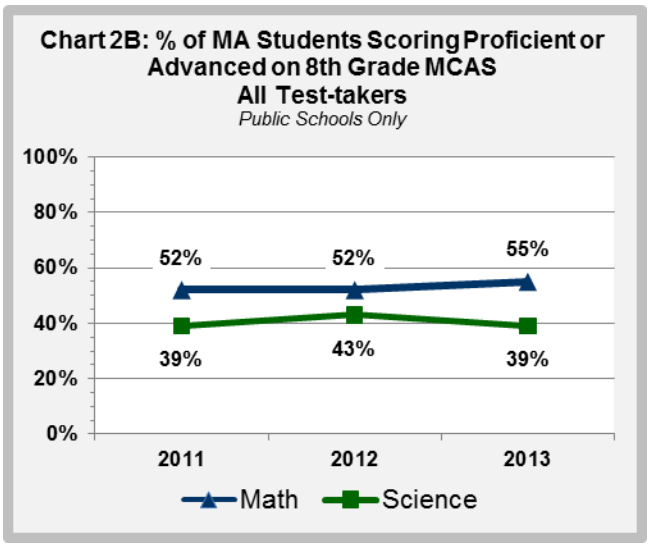


Chart 2B: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS
All Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
52%
52%
55%
39%
43%
39%
2011
2012
2013
Math
Science

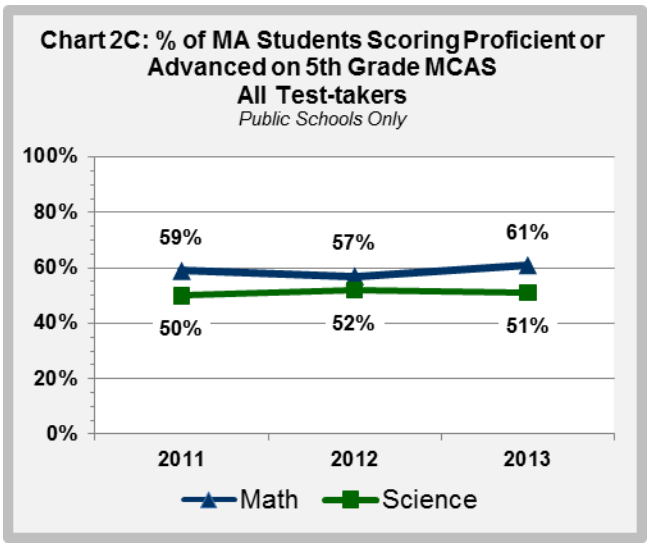


Chart 2C: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS
All Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
59%
57%
61%
50%
52%
51%
2011
2012
2013
Math
Science

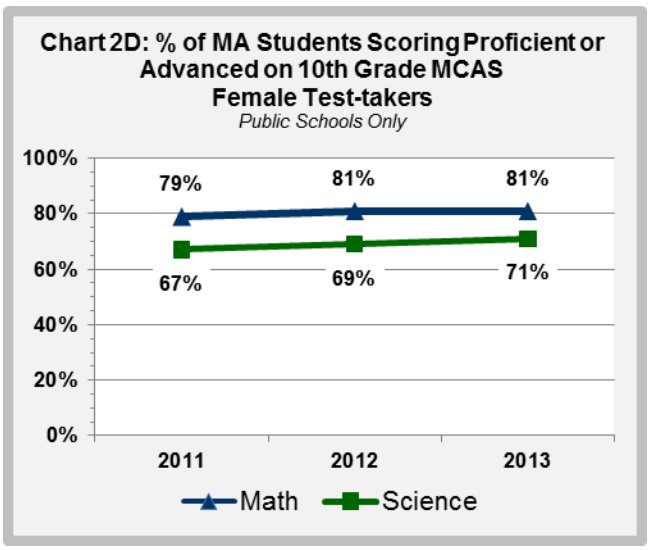


Chart 2D: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS
Female Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
79%
81%
81%
67%
69%
71%
2011
2012
2013
Math
Science

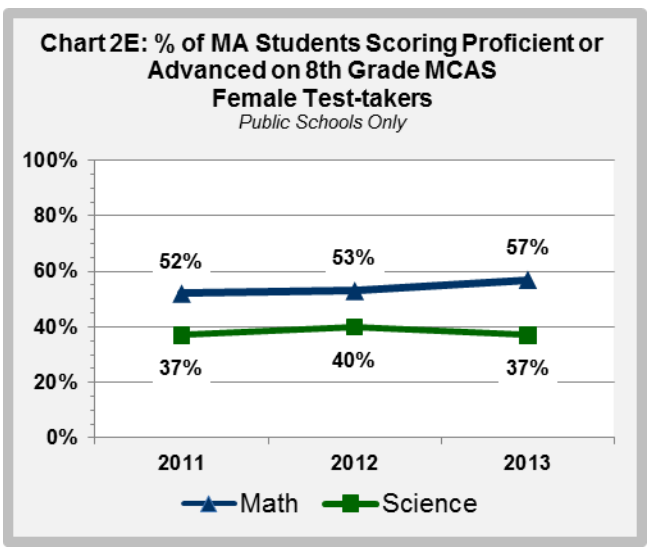


Chart 2E: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS
Female Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
52%
53%
57%
37%
40%
37%
2011
2012
2013
Math
Science

Chart 2F: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS
Female Test-takers
Public Schools Only

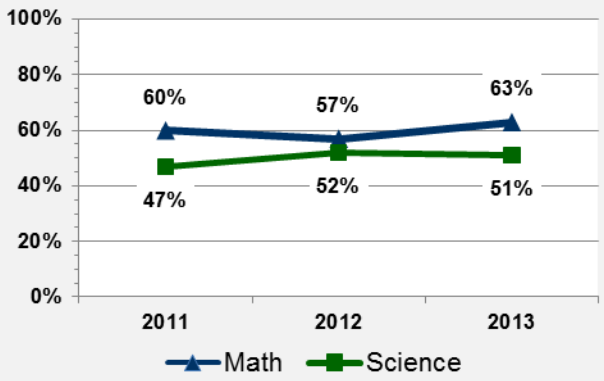


Chart 2G: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS
Male Test-takers
Public Schools Only

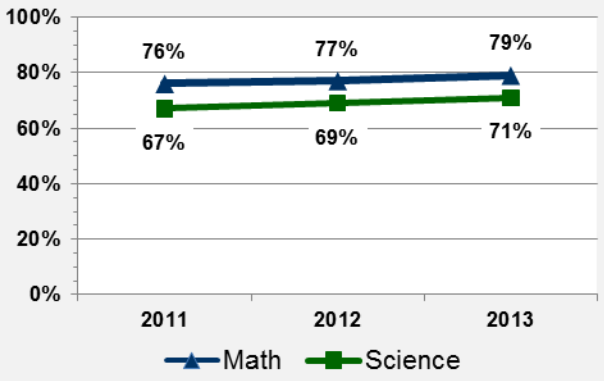


Chart 2H: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS
Male Test-takers
Public Schools Only

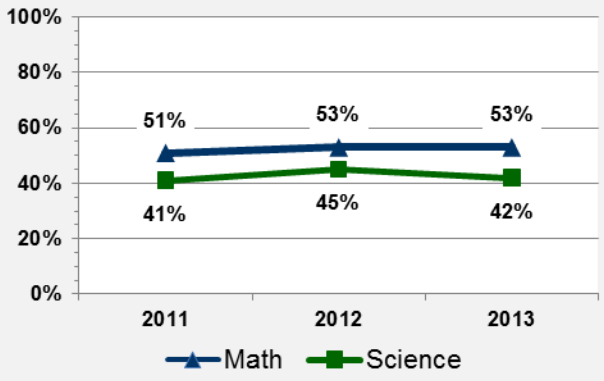


Chart 2I: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS
Male Test-takers
Public Schools Only

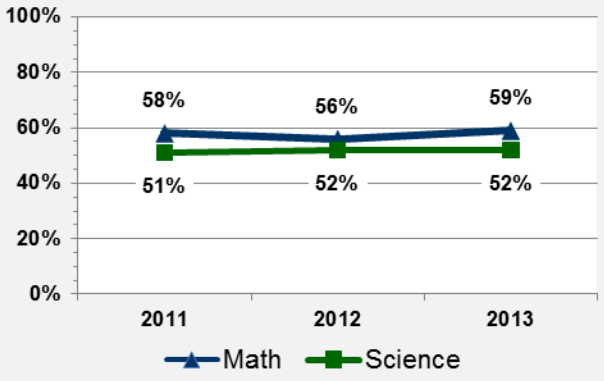


Chart 2J: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS
Asian Test-takers
Public Schools Only

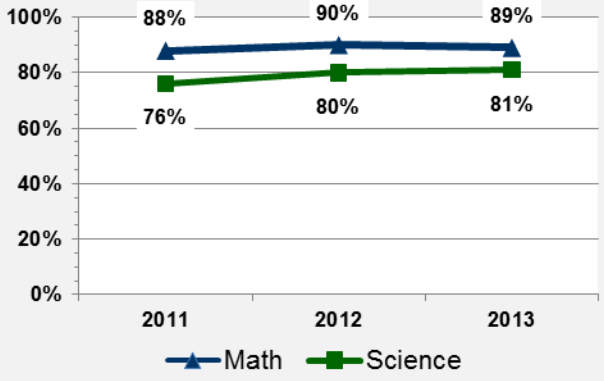


Chart 2K: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS
Asian Test-takers
Public Schools Only

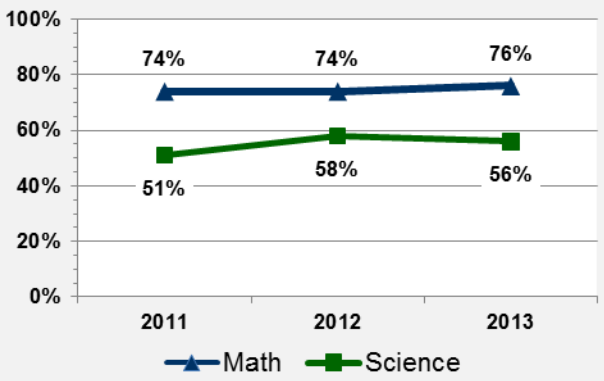


Chart 2L: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS
Asian Test-takers
Public Schools Only

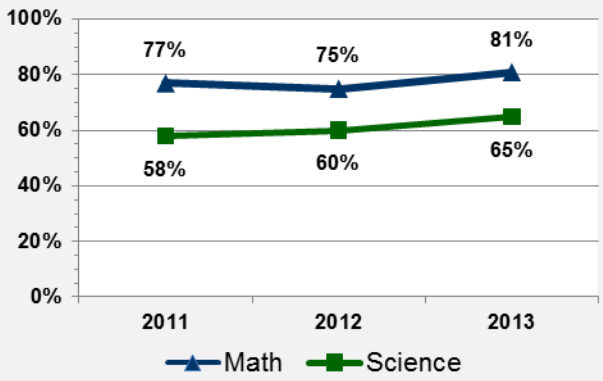


Chart 2M: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS
Black Test-takers
Public Schools Only

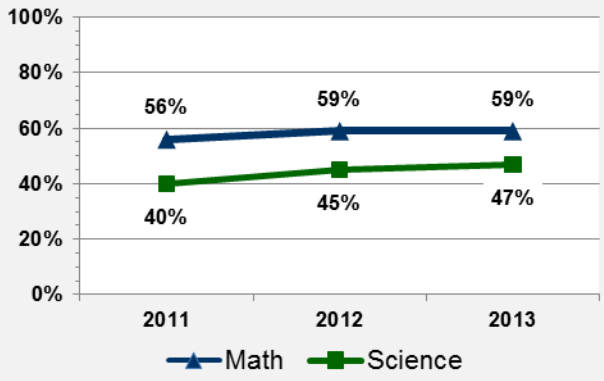


Chart 2N: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS
Black Test-takers
Public Schools Only

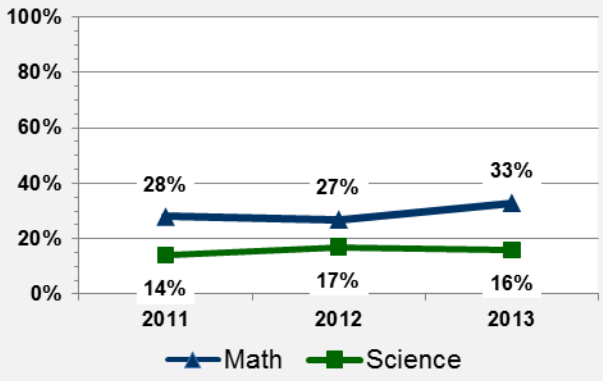


Chart 2O: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS
Black Test-takers
Public Schools Only

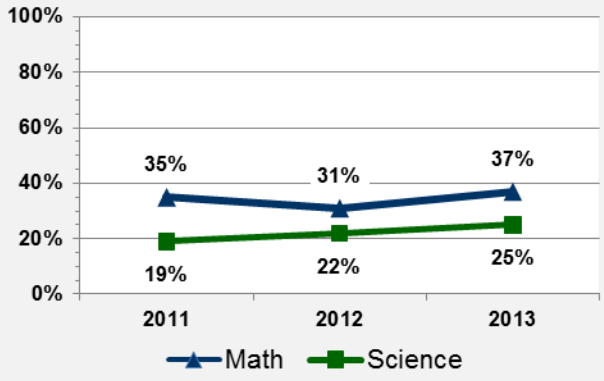


Chart 2P: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS
Hispanic Test-takers
Public Schools Only

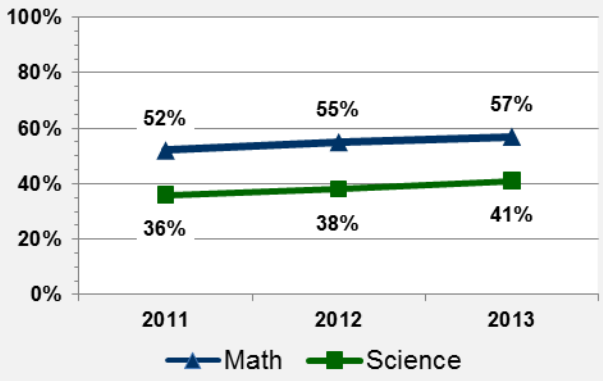


Chart 2Q: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS
Hispanic Test-takers
Public Schools Only

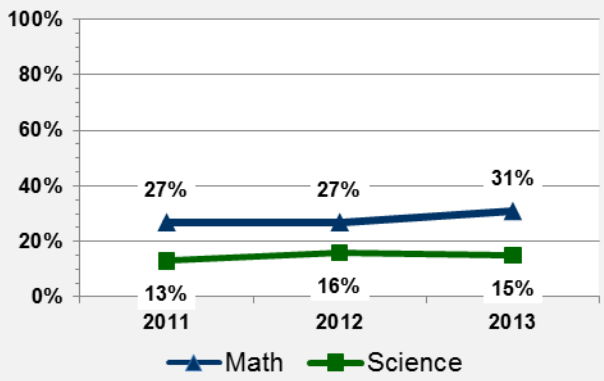


Chart 2R: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS Hispanic Test-takers
Public Schools Only

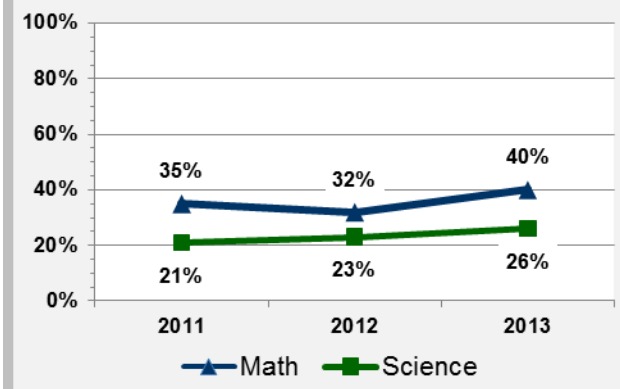


Chart 2S: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS White Test-takers
Public Schools Only

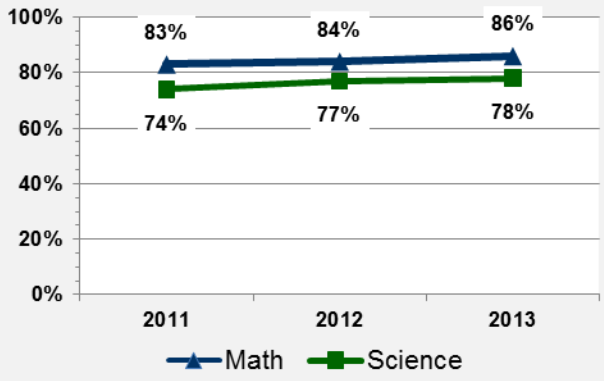


Chart 2T: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS White Test-takers
Public Schools Only

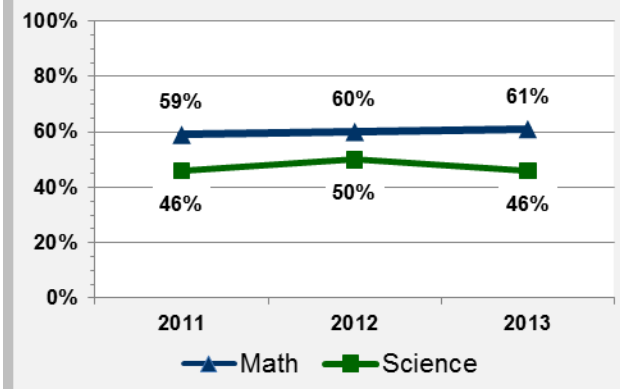


Chart 2U: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS White Test-takers
Public Schools Only

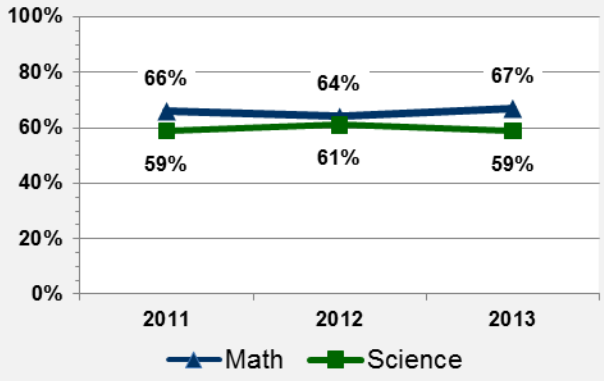


Chart 2V: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS Low-Income Test-takers
Public Schools Only

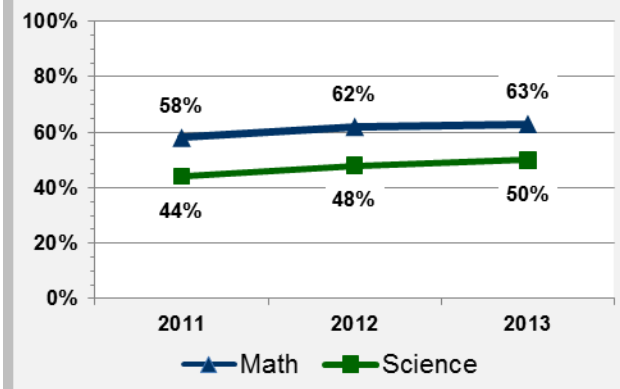
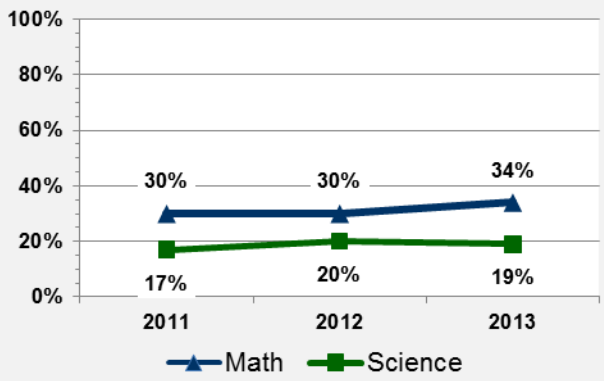


Chart 2W: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS Low-Income Test-takers
Public Schools Only



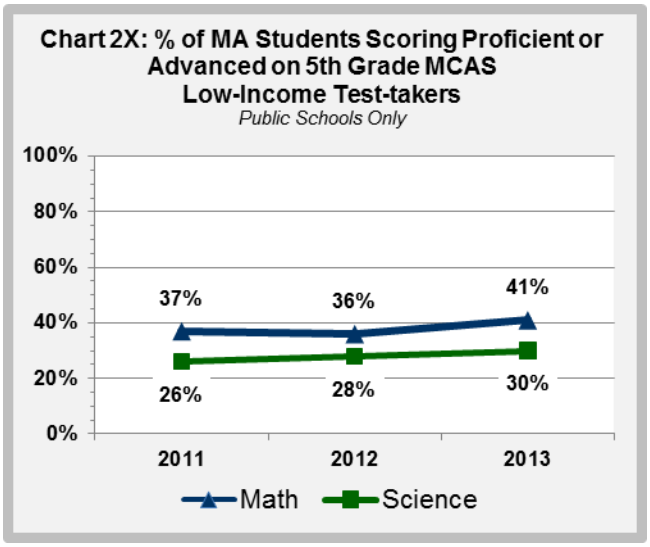


Chart 2X: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS
Low-Income Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
37%
36%
41%
26%
28%
30%
2011
2012
2013
Math
Science

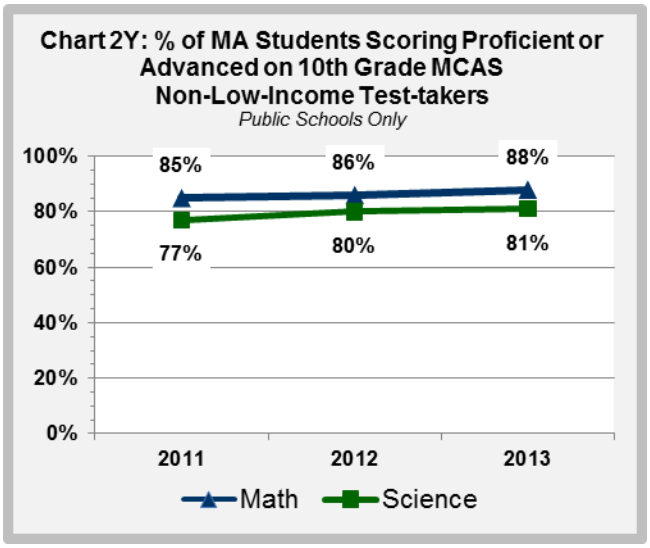


Chart 2Y: % of MA Students Scoring Proficient or Advanced on 10th Grade MCAS
Non-Low-Income Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
85%
86%
88%
77%
80%
81%
2011
2012
2013
Math
Science

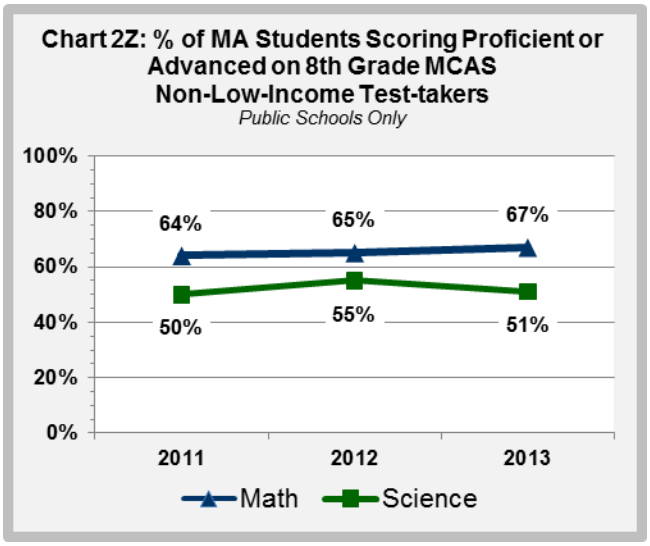


Chart 2Z: % of MA Students Scoring Proficient or Advanced on 8th Grade MCAS
Non-Low-Income Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
64%
65%
67%
50%
55%
51%
2011
2012
2013
Math
Science

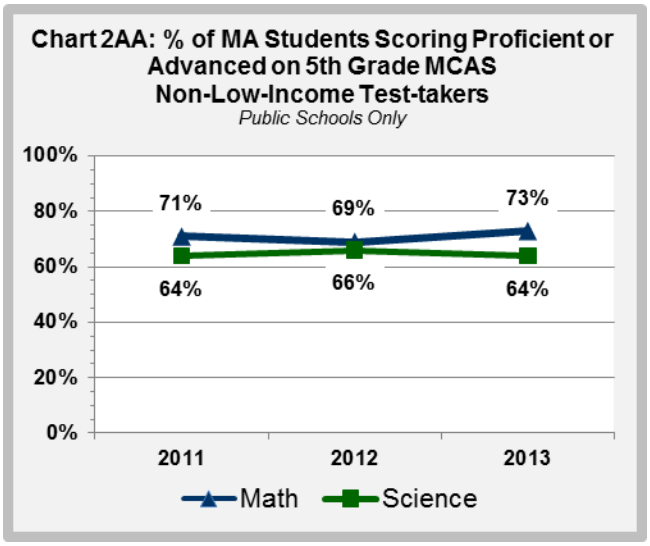


Chart 2AA: % of MA Students Scoring Proficient or Advanced on 5th Grade MCAS
Non-Low-Income Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
71%
69%
73%
64%
66%
64%
2011
2012
2013
Math
Science

Chart 2BB: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- All Test-takers
Public Schools Only

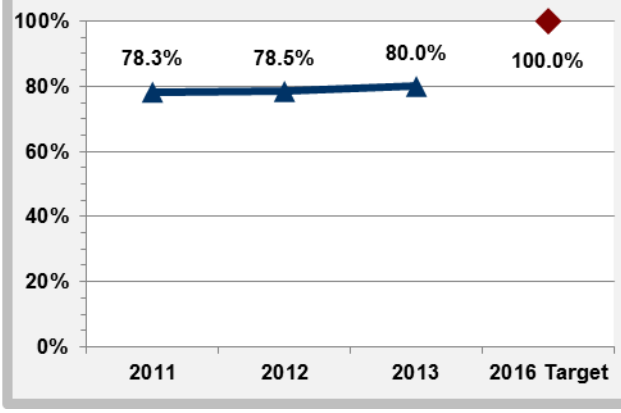


Chart 2CC: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- Female Test-takers
Public Schools Only

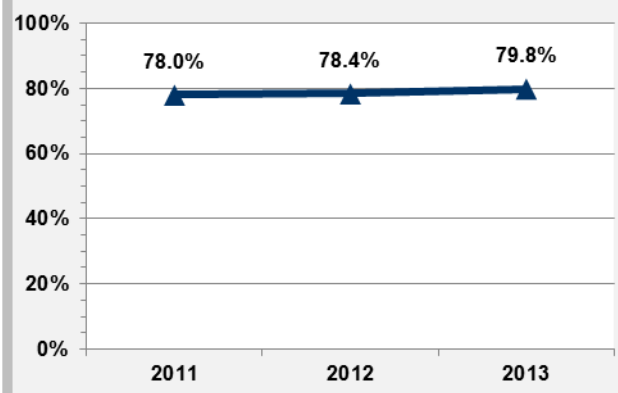


Chart 2DD: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- Male Test-takers
Public Schools Only

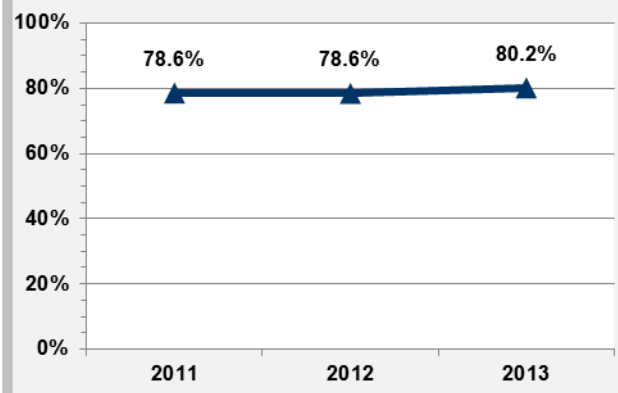


Chart 2EE: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- Asian Test-takers
Public Schools Only

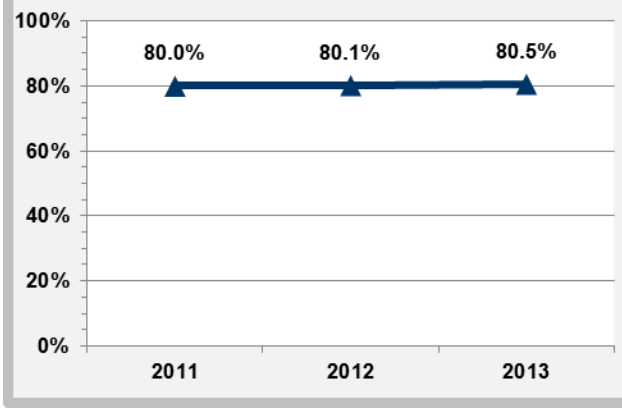


Chart 2FF: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- Black Test-takers
Public Schools Only

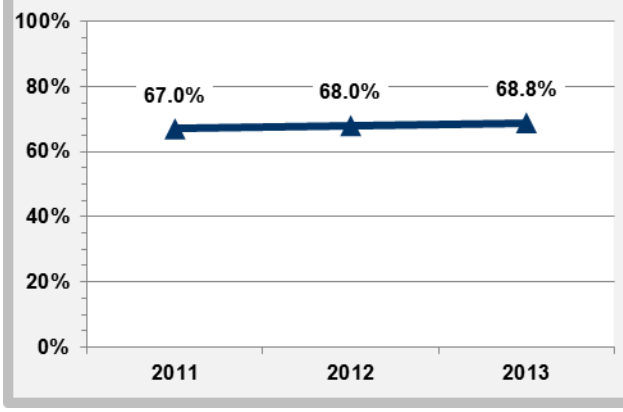
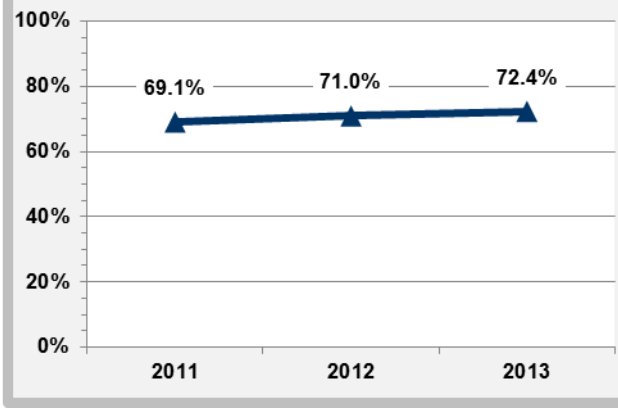


Chart 2GG: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- Hispanic Test-takers
Public Schools Only



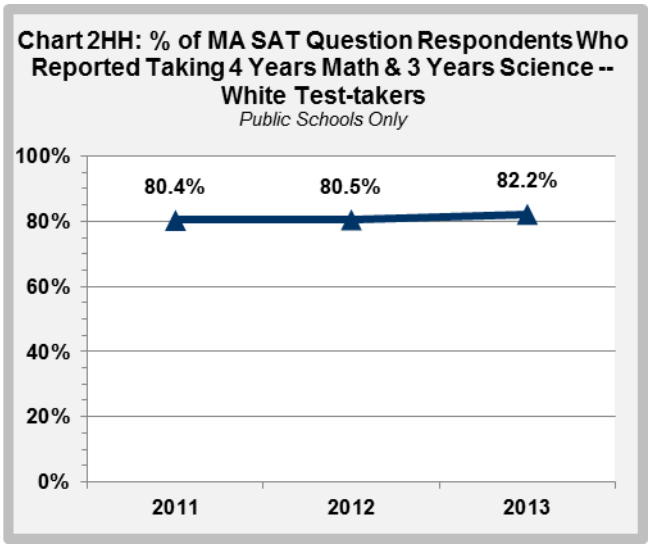


Chart 2HH: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- White Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
80.4%
80.5%
82.2%
2011
2012
2013

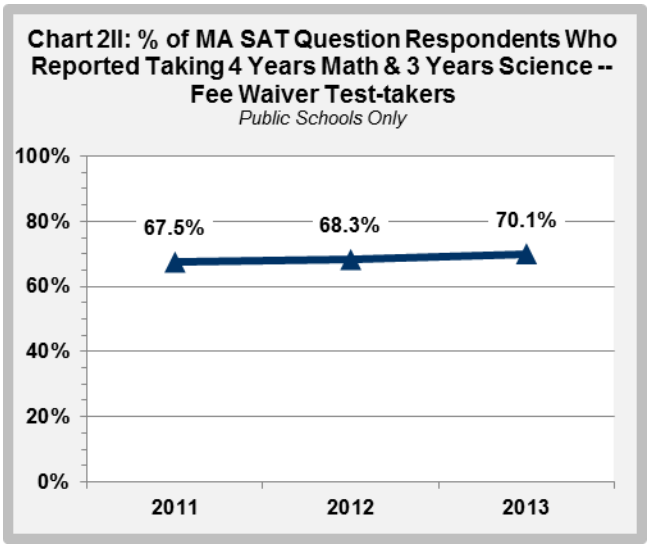


Chart 2II: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- Fee Waiver Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
67.5%
68.3%
70.1%
2011
2012
2013

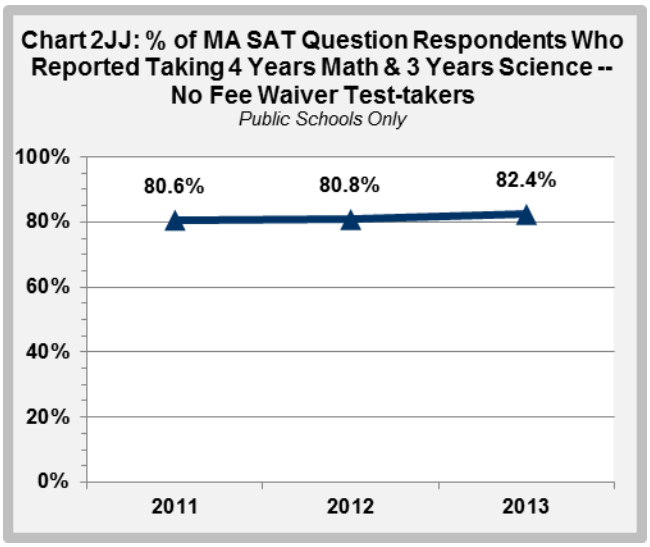


Chart 2JJ: % of MA SAT Question Respondents Who Reported Taking 4 Years Math & 3 Years Science -- No Fee Waiver Test-takers
Public Schools Only
100%
80%
60%
40%
20%
0%
80.6%
80.8%
82.4%
2011
2012
2013

Goal 3 Indicators: Skilled STEM Educators

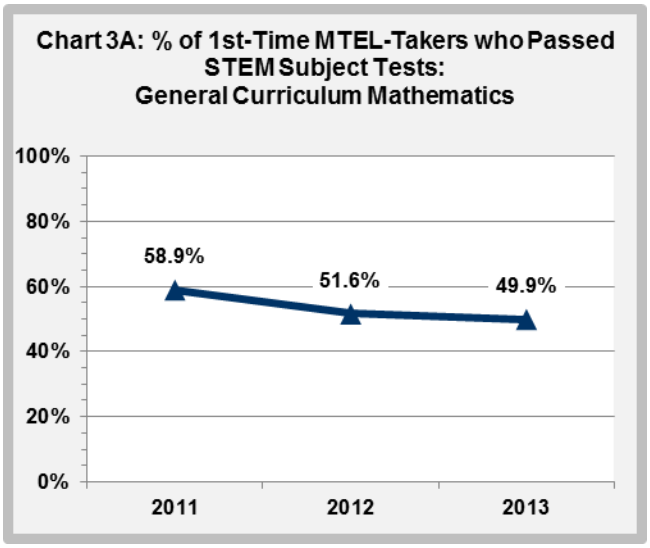


Chart 3A: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: General Curriculum Mathematics
100%
80%
60%
40%
20%
0%
58.9%
51.6%
49.9%
2011
2012
2013

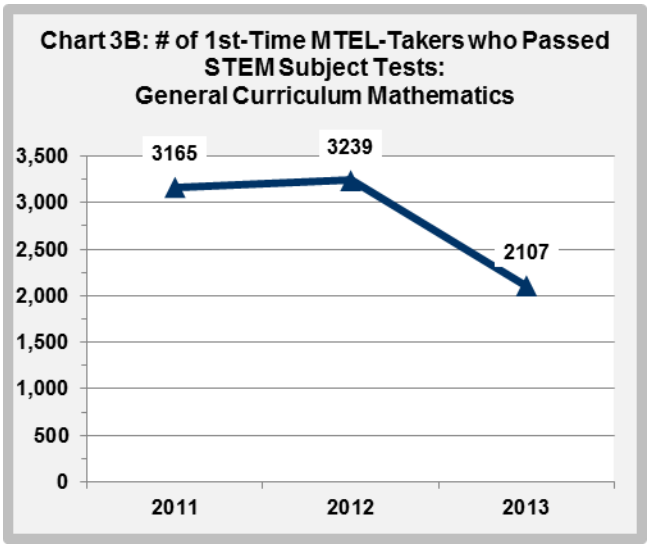


Chart 3B: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: General Curriculum Mathematics
3,500
3,000
2,500
2,000
1,500
1,000
500
0
3165
3239
2107
2011
2012
2013

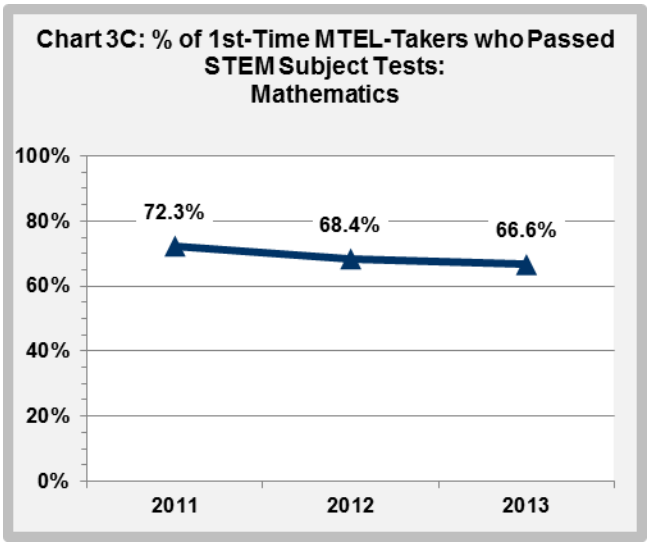


Chart 3C: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Mathematics
100%
80%
60%
40%
20%
0%
72.3%
68.4%
66.6%
2011
2012
2013

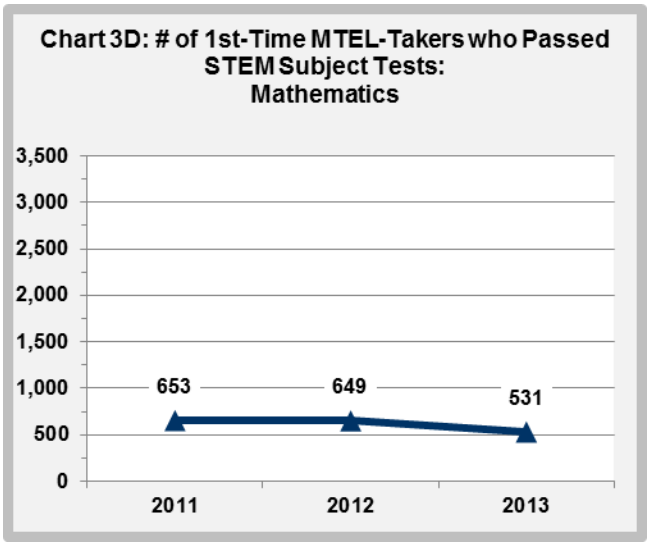


Chart 3D: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Mathematics
3,500
3,000
2,500
2,000
1,500
1,000
500
0
653
649
531
2011
2012
2013

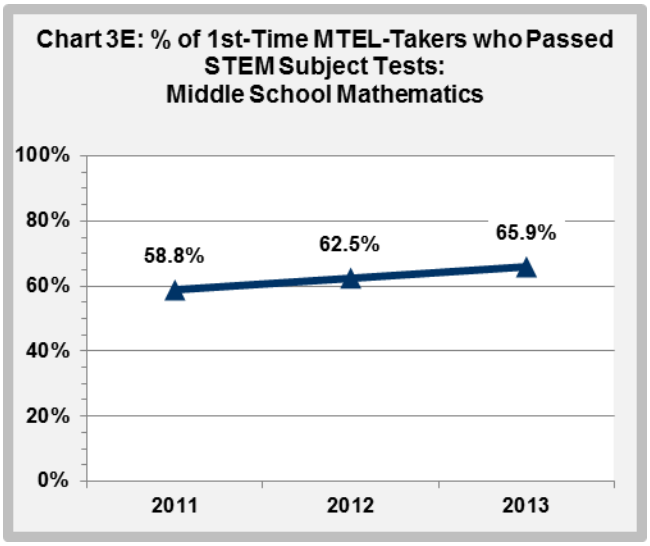


Chart 3E: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Middle School Mathematics
100%
80%
60%
40%
20%
0%
58.8%
62.5%
65.9%
2011
2012
2013

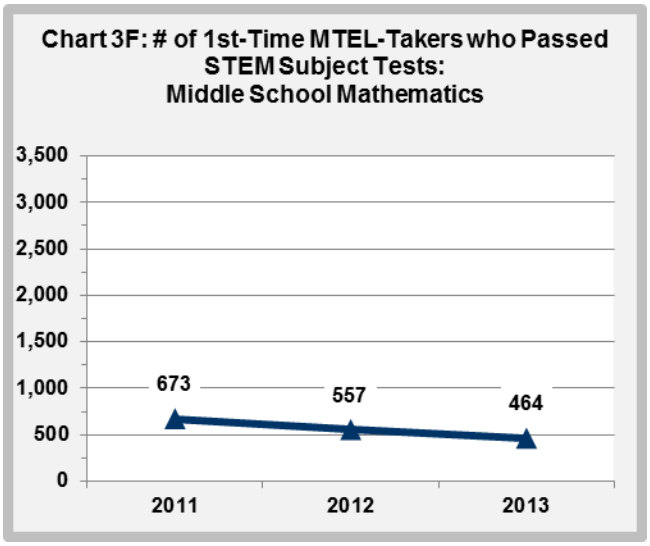


Chart 3F: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Middle School Mathematics
3,500
3,000
2,500
2,000
1,500
1,000
500
0
673
557
464
2011
2012
2013

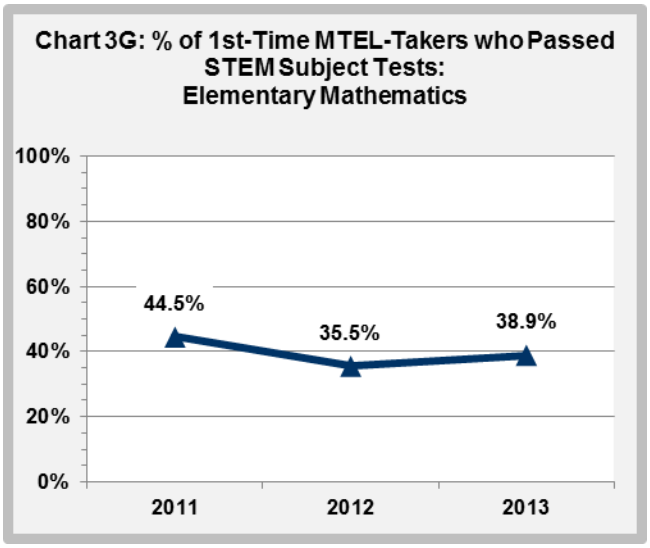


Chart 3G: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Elementary Mathematics
100%
80%
60%
40%
20%
0%
44.5%
35.5%
38.9%
2011
2012
2013

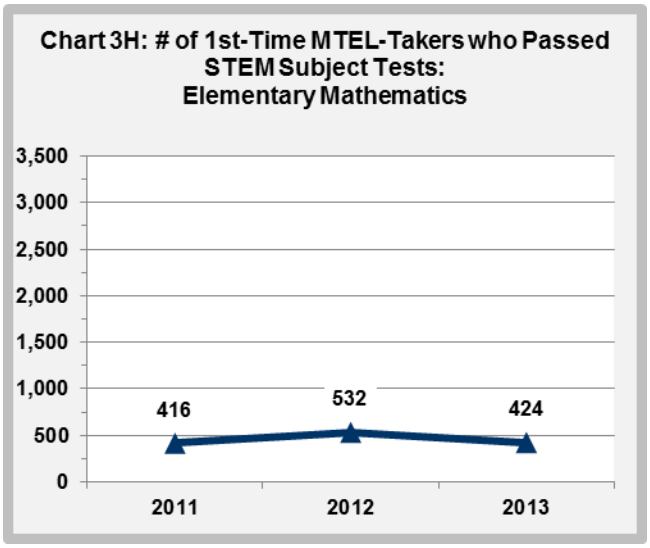


Chart 3H: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Elementary Mathematics
3,500
3,000
2,500
2,000
1,500
1,000
500
0
416
532
424
2011
2012
2013

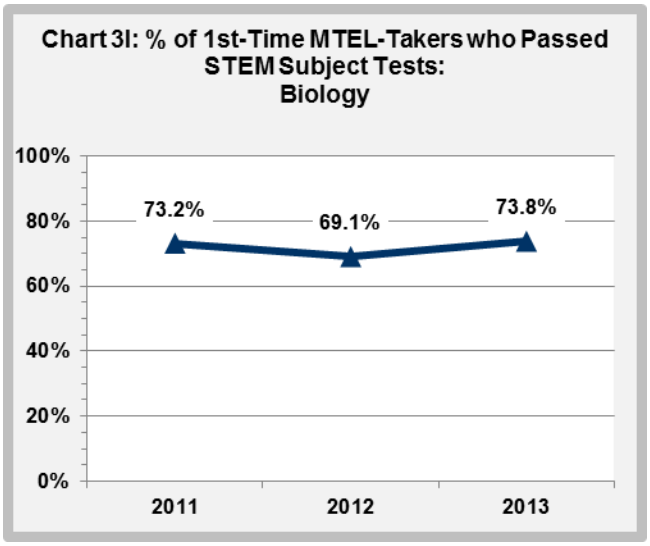


Chart 3I: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Biology
100%
80%
60%
40%
20%
0%
73.2%
69.1%
73.8%
2011
2012
2013

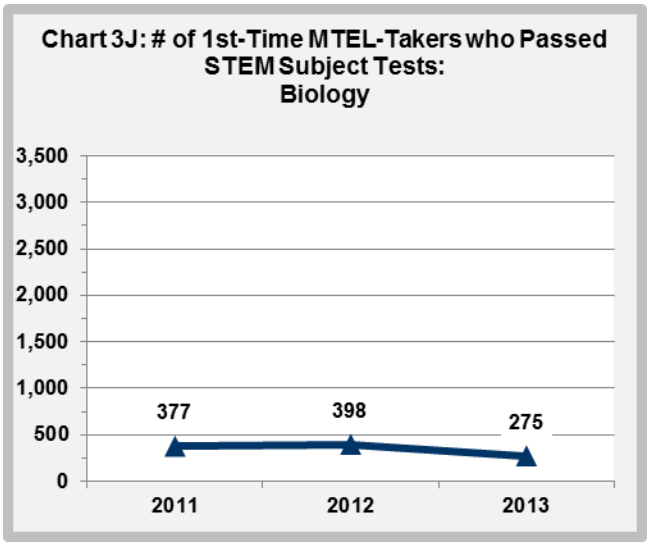


Chart 3J: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Biology
3,500
3,000
2,500
2,000
1,500
1,000
500
0
377
398
275
2011
2012
2013

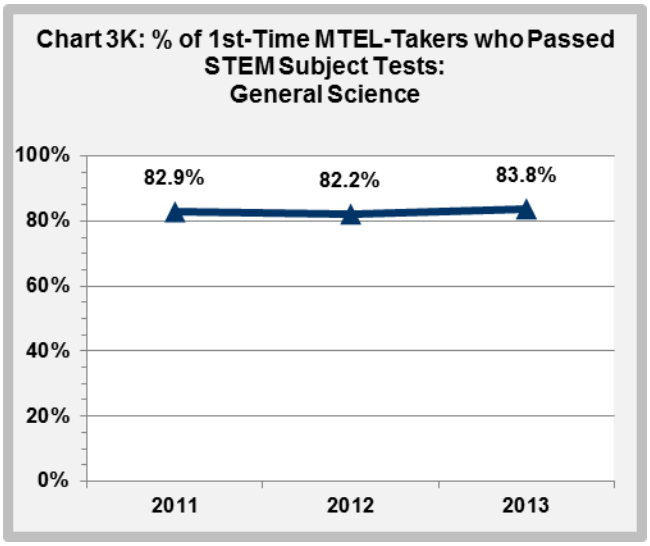


Chart 3K: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: General Science
100%
80%
60%
40%
20%
0%
82.9%
82.2%
83.8%
2011
2012
2013

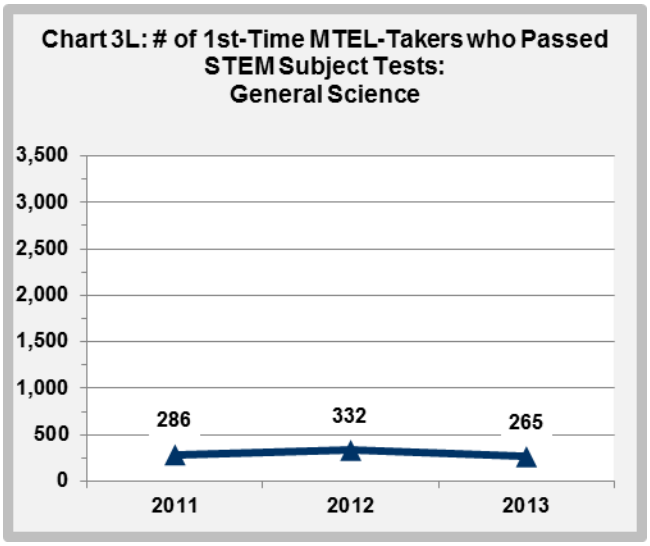


Chart 3L: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: General Science
3,500
3,000
2,500
2,000
1,500
1,000
500
0
286
332
265
2011
2012
2013

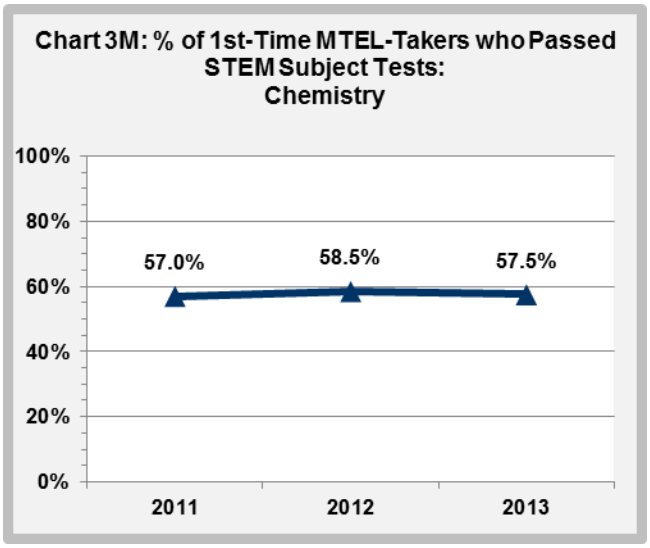


Chart 3M: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Chemistry
100%
80%
60%
40%
20%
0%
57.0%
58.5%
57.5%
2011
2012
2013

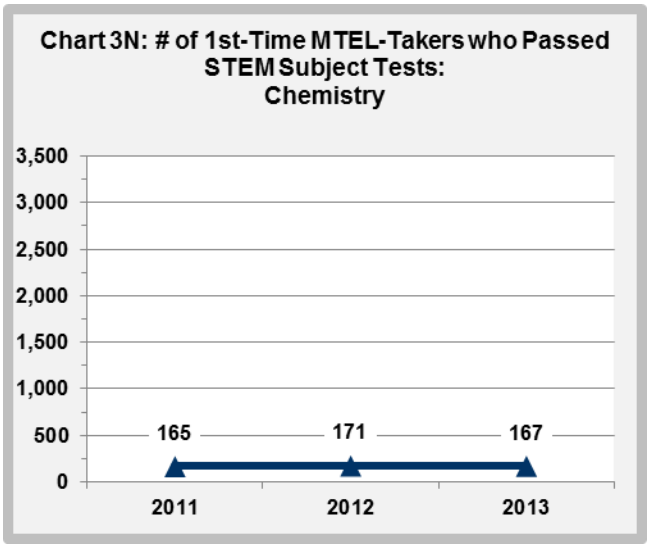


Chart 3N: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Chemistry
3,500
3,000
2,500
2,000
1,500
1,000
500
0
165
171
167
2011
2012
2013

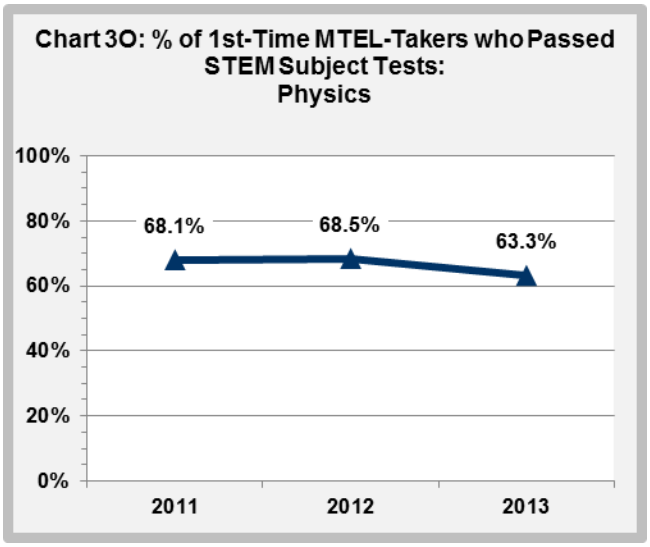


Chart 3O: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Physics
100%
80%
60%
40%
20%
0%
68.1%
68.5%
63.3%
2011
2012
2013

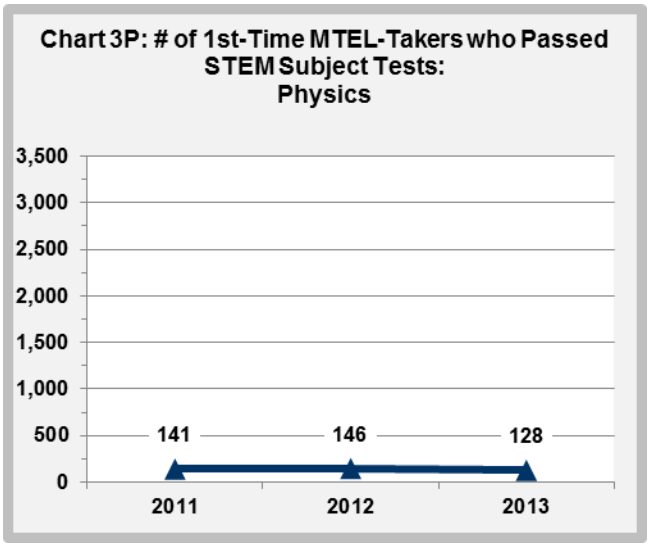


Chart 3P: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Physics
3,500
3,000
2,500
2,000
1,500
1,000
500
0
141
146
128
2011
2012
2013

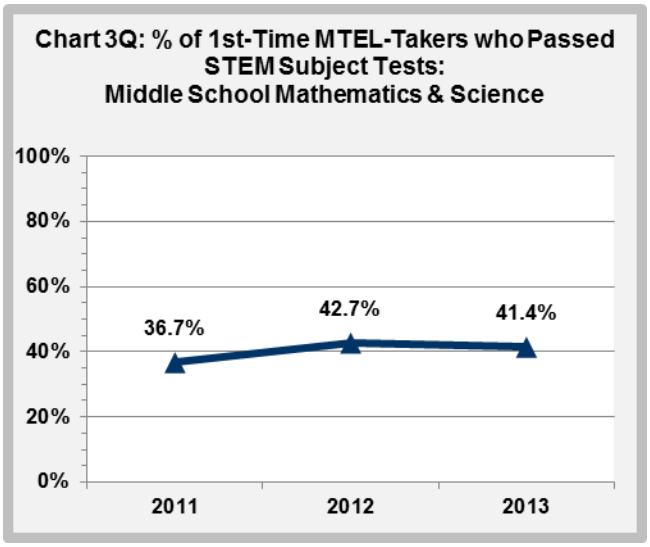


Chart 3Q: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Middle School Mathematics & Science
100%
80%
60%
40%
20%
0%
36.7%
42.7%
41.4%
2011
2012
2013

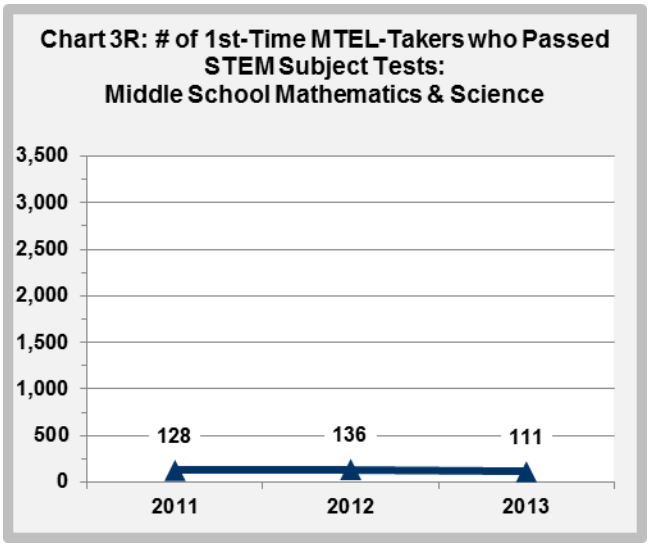


Chart 3R: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Middle School Mathematics & Science
3,500
3,000
2,500
2,000
1,500
1,000
500
0
128
136
111
2011
2012
2013

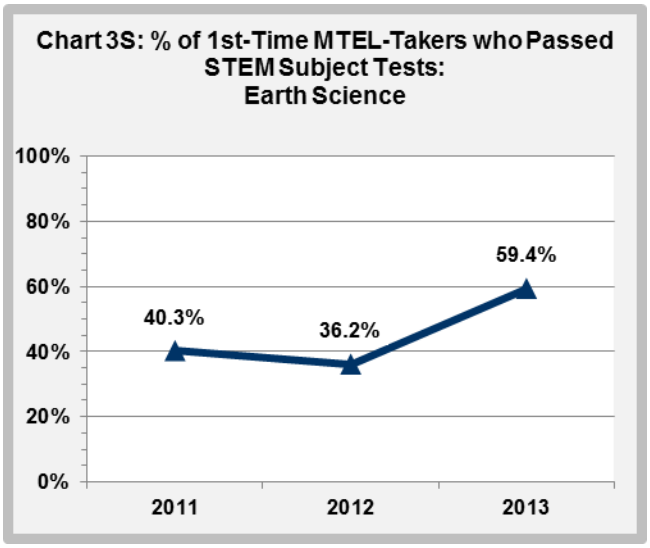


Chart 3S: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Earth Science
100%
80%
60%
40%
20%
0%
40.3%
36.2%
59.4%
2011
2012
2013

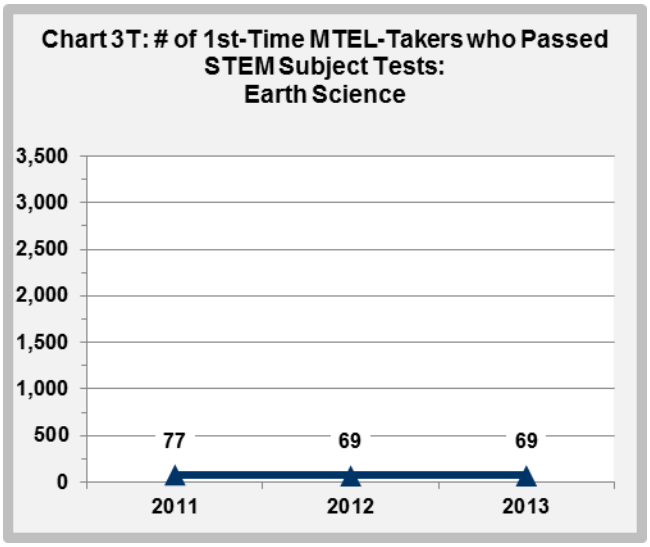


Chart 3T: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Earth Science
3,500
3,000
2,500
2,000
1,500
1,000
500
0
77
69
69
2011
2012
2013

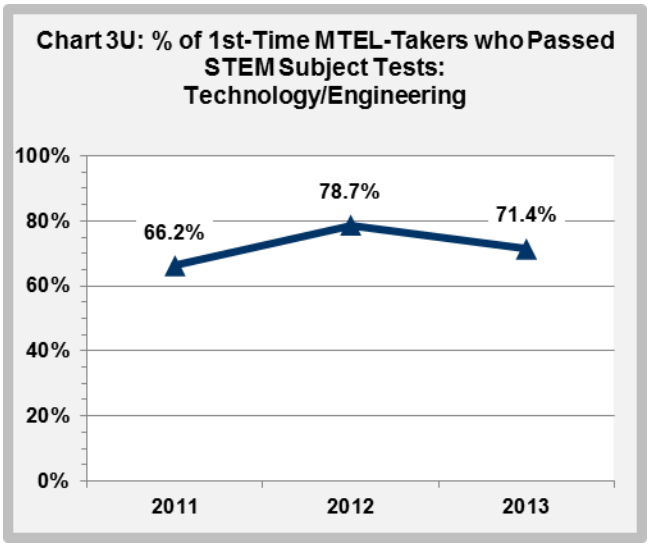


Chart 3U: % of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Technology/Engineering
100%
80%
60%
40%
20%
0%
66.2%
78.7%
71.4%
2011
2012
2013

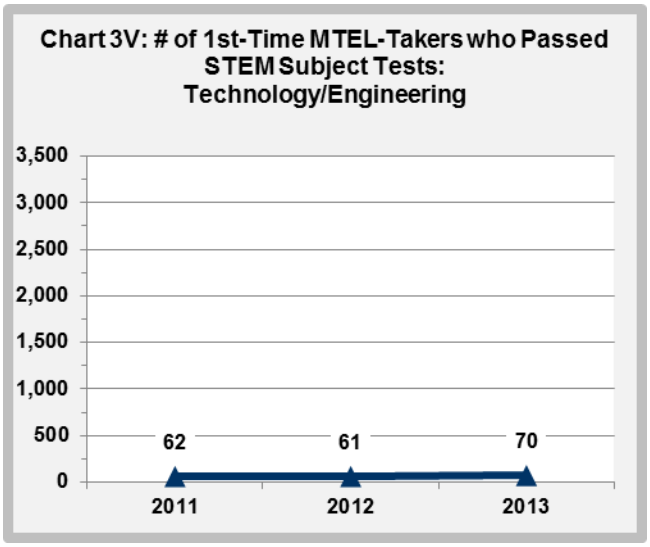


Chart 3V: # of 1st-Time MTEL-Takers who Passed STEM Subject Tests: Technology/Engineering
3,500
3,000
2,500
2,000
1,500
1,000
500
0
62
61
70
2011
2012
2013

Goal 4 Indicators: STEM Post-Secondary Certificates & Degrees

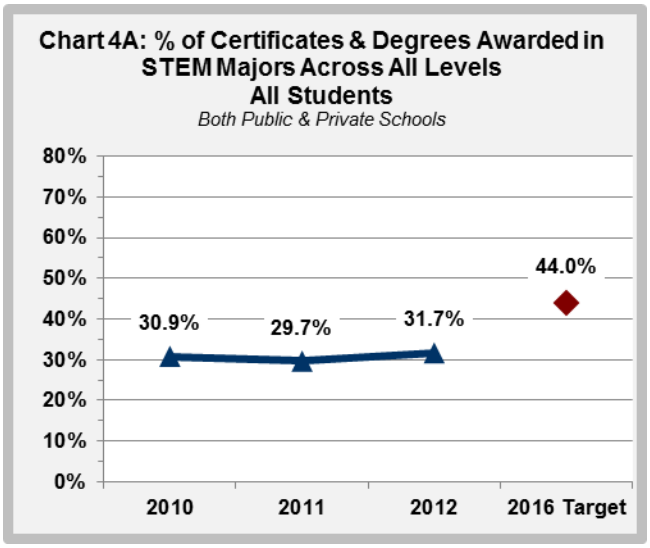


Chart 4A: % of Certificates & Degrees Awarded in STEM Majors Across All Levels
All Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
30.9%
29.7%
31.7%
44.0%
2010
2011
2012
2016 Target

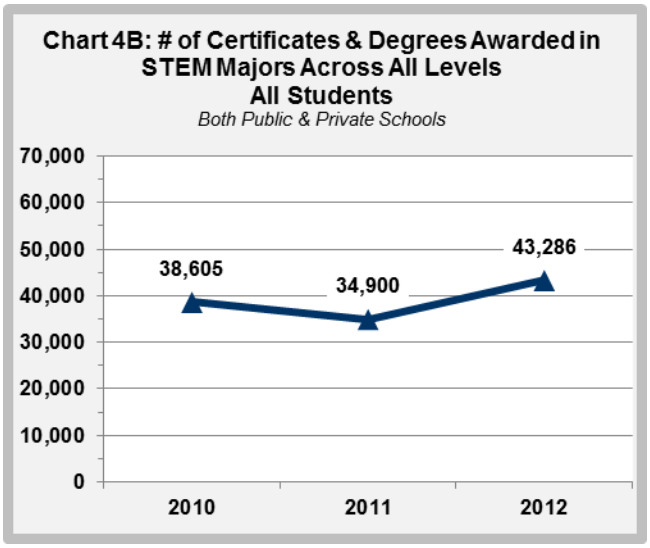


Chart 4B: # of Certificates & Degrees Awarded in STEM Majors Across All Levels
All Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
38,605
34,900
43,286
2010
2011
2012

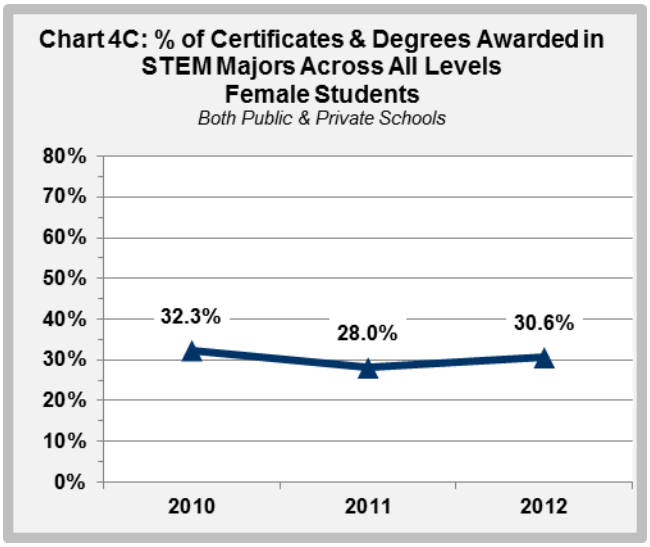


Chart 4C: % of Certificates & Degrees Awarded in STEM Majors Across All Levels
Female Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
32.3%
28.0%
30.6%
2010
2011
2012

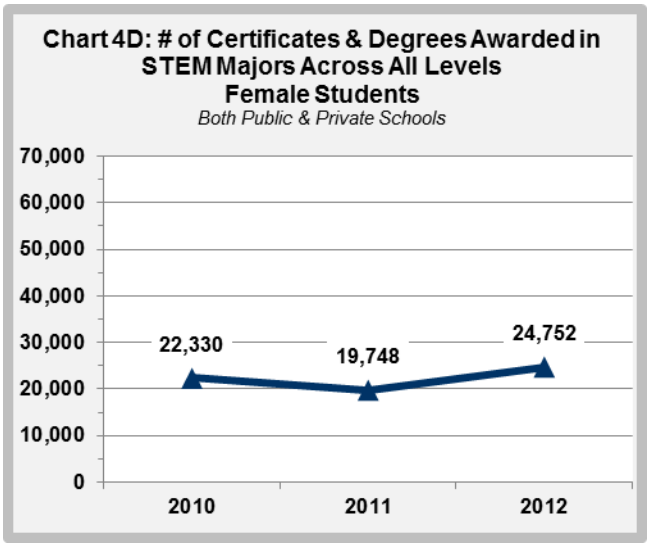


Chart 4D: # of Certificates & Degrees Awarded in STEM Majors Across All Levels
Female Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
22,330
19,748
24,752
2010
2011
2012

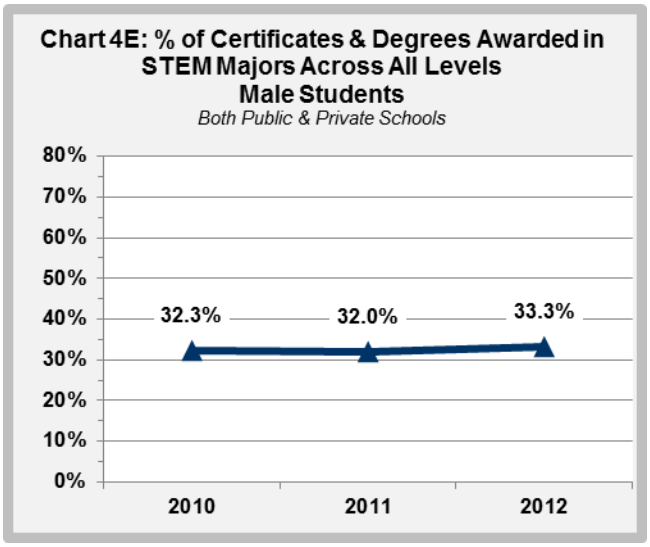


Chart 4E: % of Certificates & Degrees Awarded in STEM Majors Across All Levels
Male Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
32.3%
32.0%
33.3%
2010
2011
2012

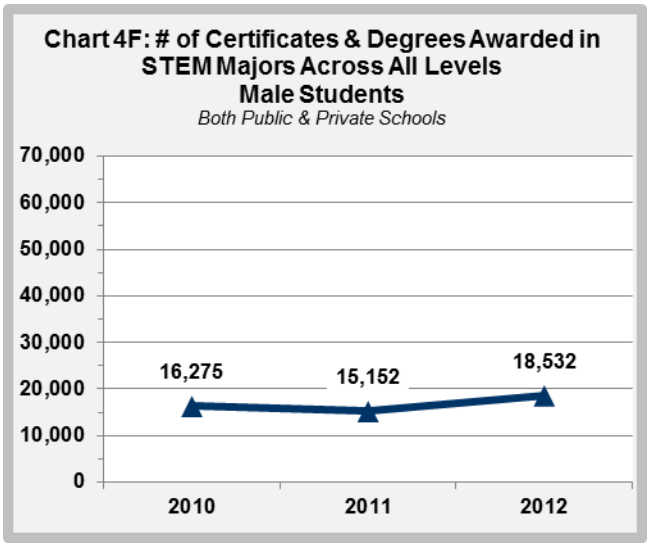


Chart 4F: # of Certificates & Degrees Awarded in STEM Majors Across All Levels
Male Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
16,275
15,152
18,532
2010
2011
2012

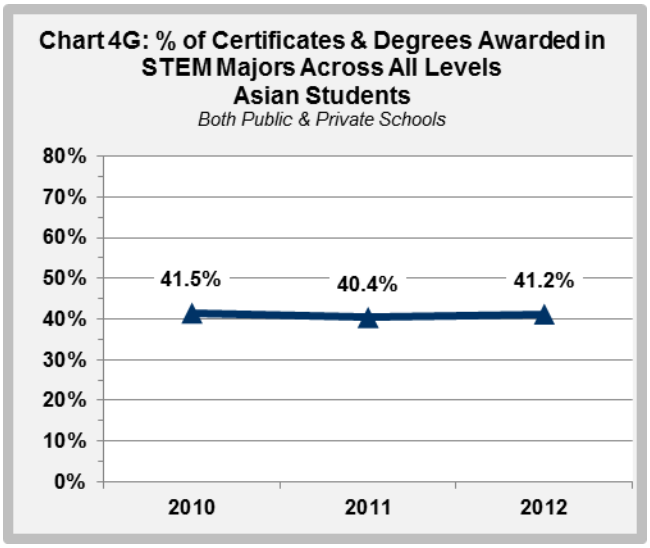


Chart 4G: % of Certificates & Degrees Awarded in STEM Majors Across All Levels
Asian Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
41.5%
40.4%
41.2%
2010
2011
2012

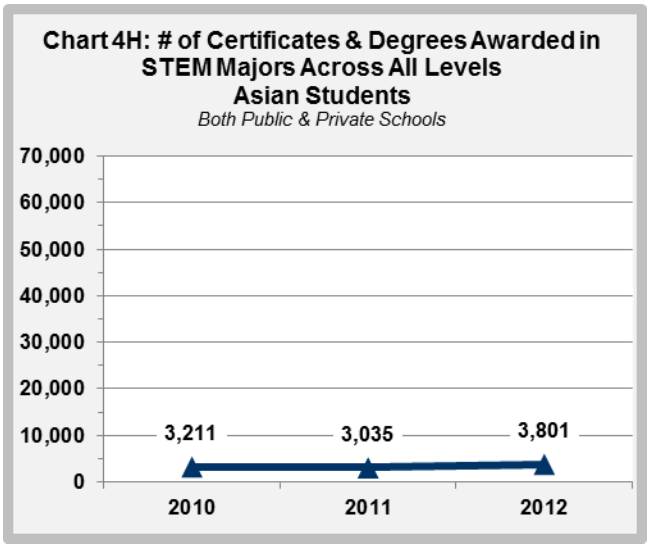


Chart 4H: # of Certificates & Degrees Awarded in STEM Majors Across All Levels
Asian Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
3,211
3,035
3,801
2010
2011
2012

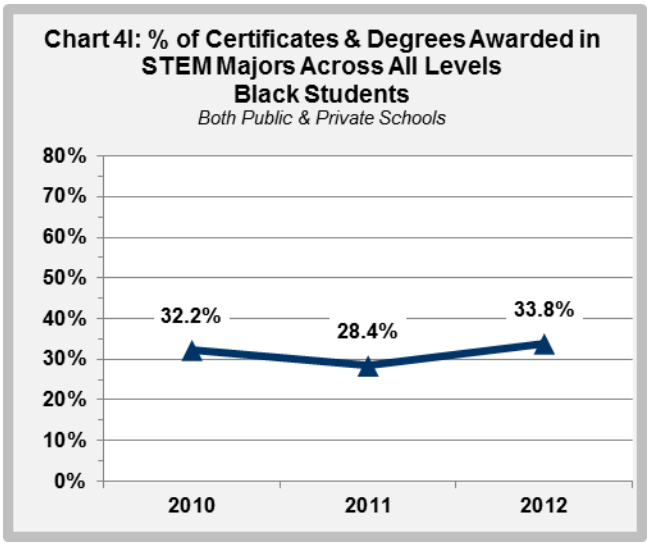


Chart 4I: % of Certificates & Degrees Awarded in STEM Majors Across All Levels
Black Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
32.2%
28.4%
33.8%
2010
2011
2012

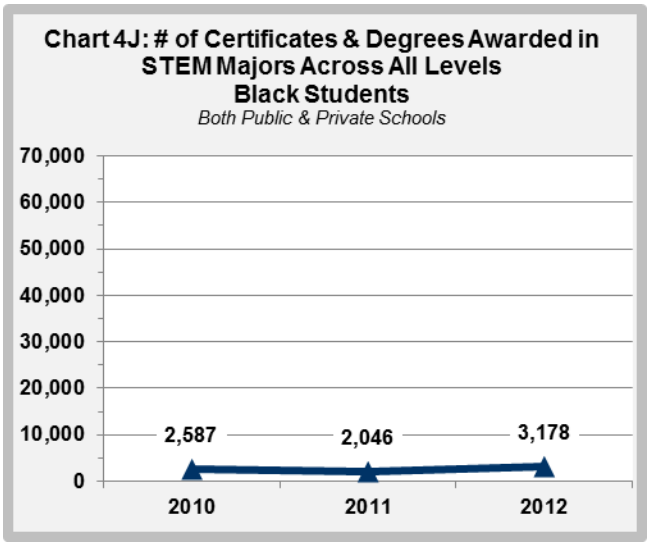


Chart 4J: # of Certificates & Degrees Awarded in STEM Majors Across All Levels
Black Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2,587
2,046
3,178
2010
2011
2012

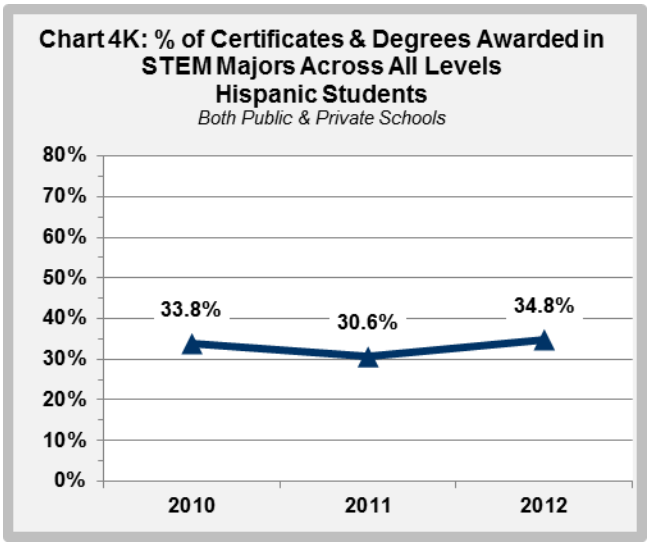


Chart 4K: % of Certificates & Degrees Awarded in STEM Majors Across All Levels
Hispanic Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
33.8%
30.6%
34.8%
2010
2011
2012

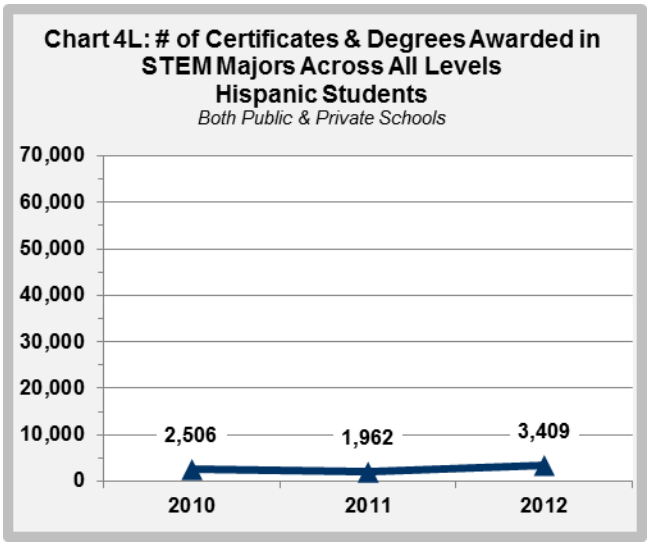


Chart 4L: # of Certificates & Degrees Awarded in STEM Majors Across All Levels
Hispanic Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2,506
1,962
3,409
2010
2011
2012

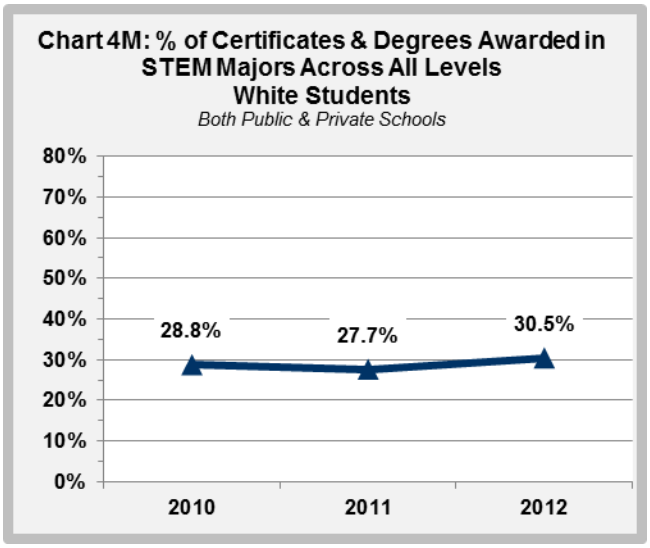


Chart 4M: % of Certificates & Degrees Awarded in STEM Majors Across All Levels White Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
28.8%
27.7%
30.5%
2010
2011
2012

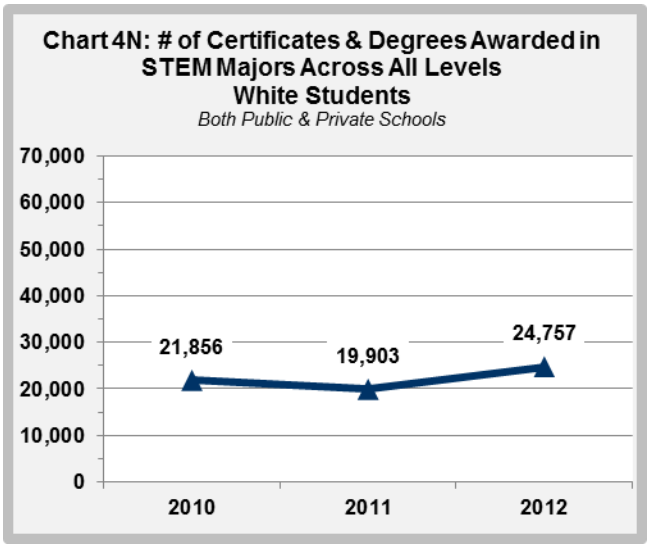


Chart 4N: # of Certificates & Degrees Awarded in STEM Majors Across All Levels White Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
21,856
19,903
24,757
2010
2011
2012

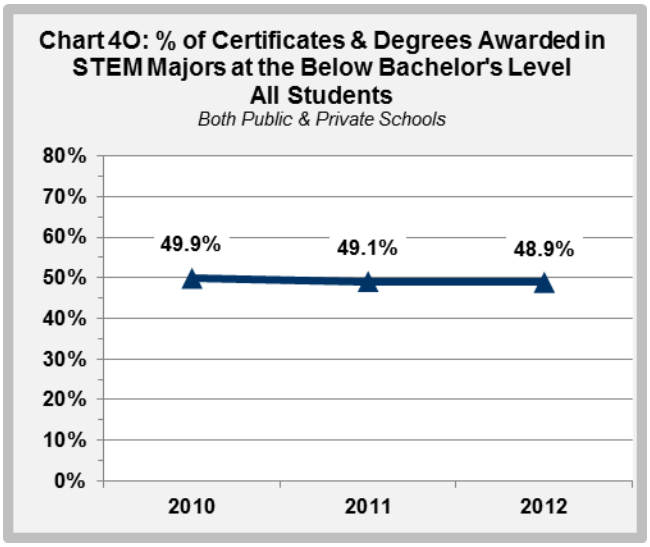


Chart 4O: % of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level All Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
49.9%
49.1%
48.9%
2010
2011
2012

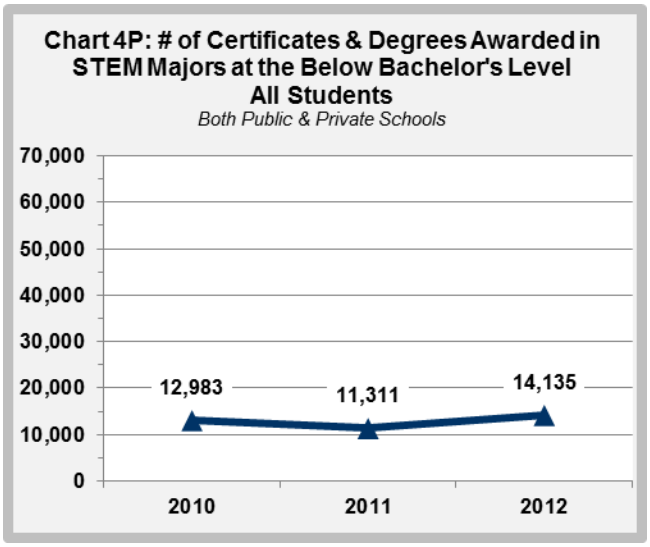


Chart 4P: # of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level All Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
12,983
11,311
14,135
2010
2011
2012

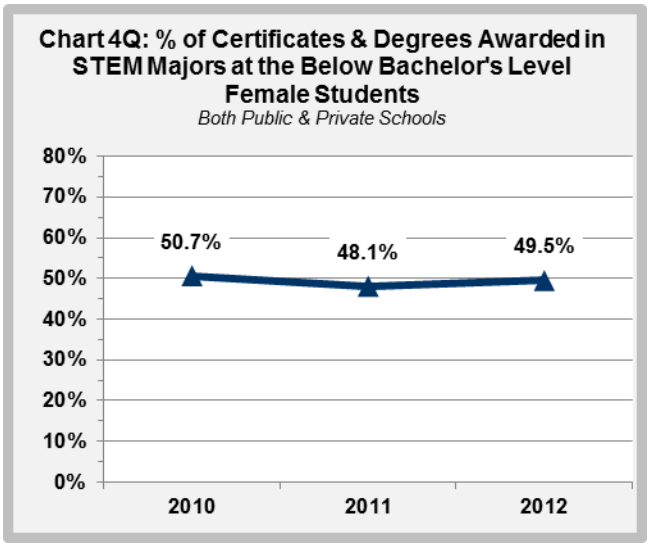


Chart 4Q: % of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level Female Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
50.7%
48.1%
49.5%
2010
2011
2012

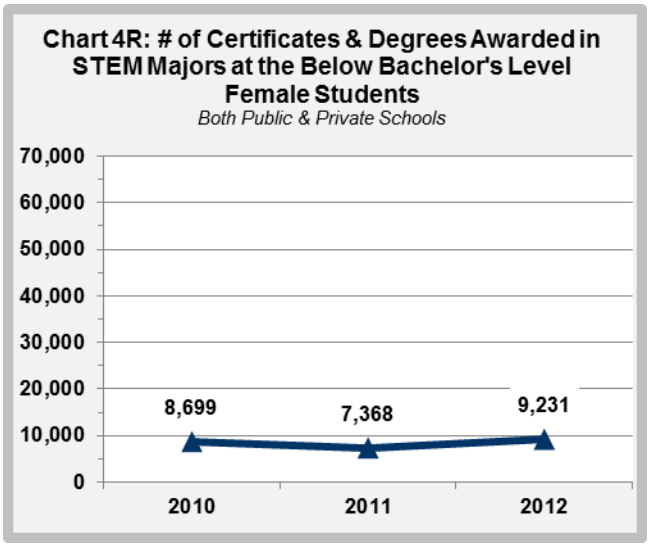


Chart 4R: # of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level Female Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
8,699
7,368
9,231
2010
2011
2012

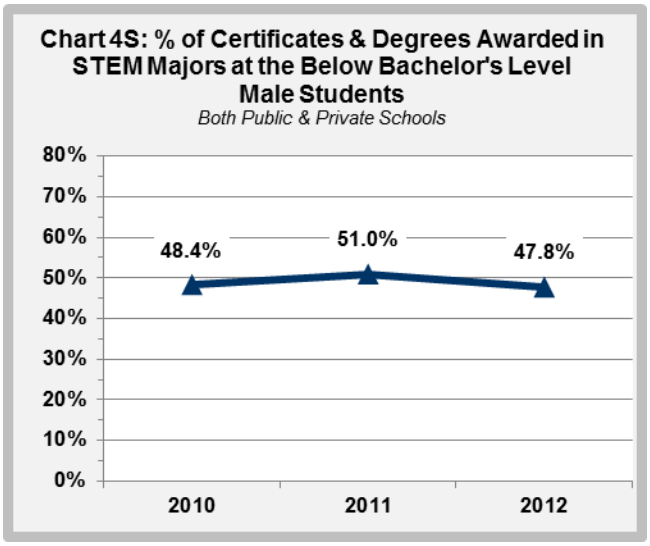


Chart 4S: % of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
Male Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
48.4%
51.0%
47.8%
2010
2011
2012

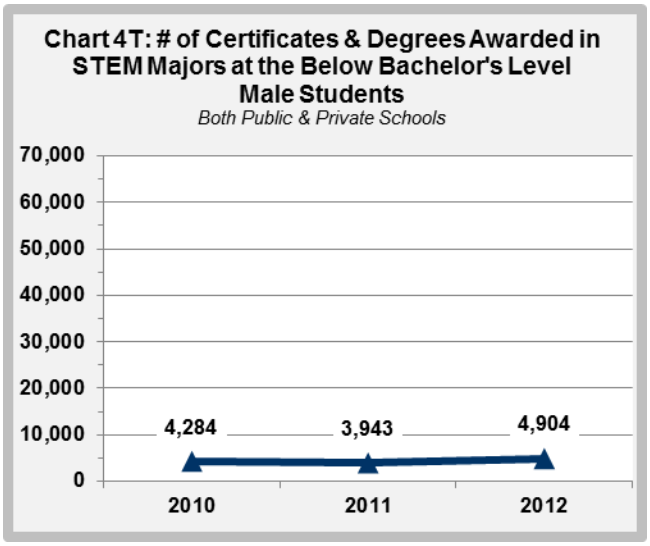


Chart 4T: # of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
Male Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
4,284
3,943
4,904
2010
2011
2012

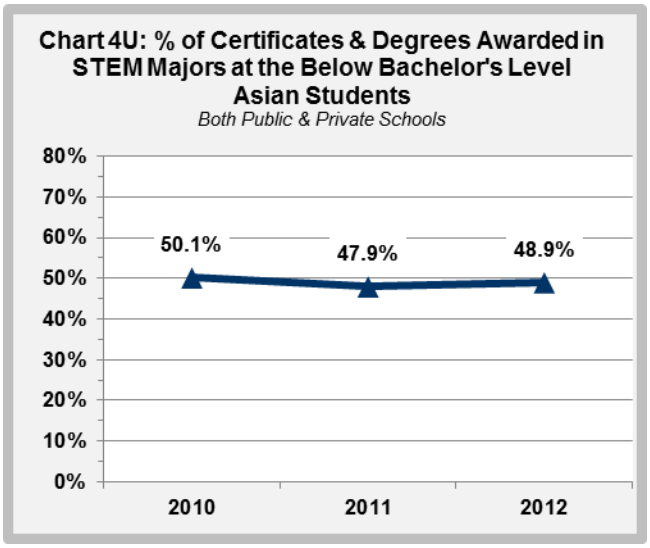


Chart 4U: % of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
Asian Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
50.1%
47.9%
48.9%
2010
2011
2012

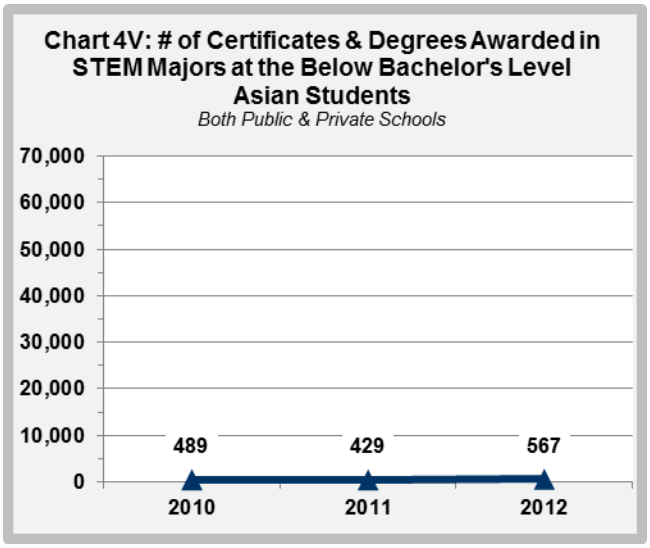


Chart 4V: # of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
Asian Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
489
429
567
2010
2011
2012

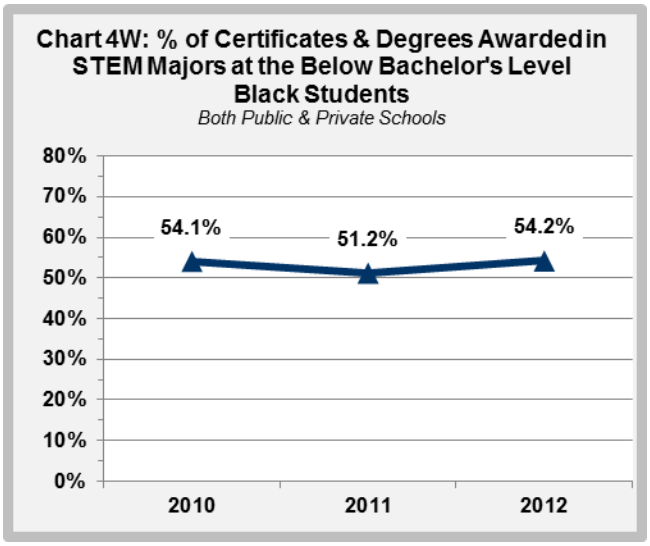


Chart 4W: % of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
Black Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
54.1%
51.2%
54.2%
2010
2011
2012

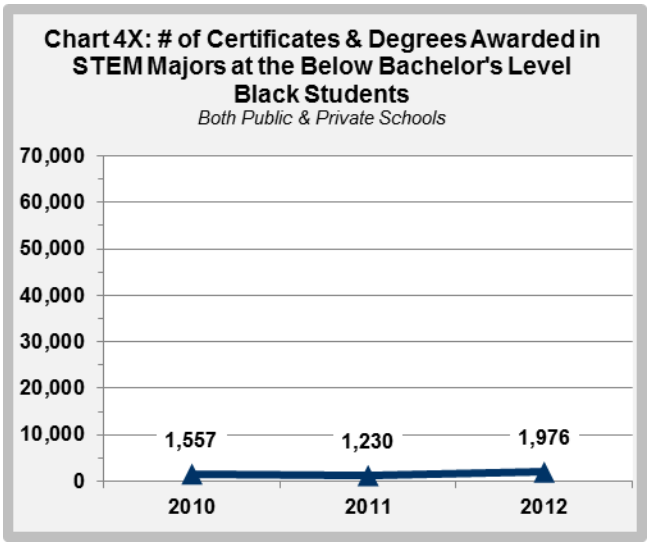


Chart 4X: # of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
Black Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1,557
1,230
1,976
2010
2011
2012

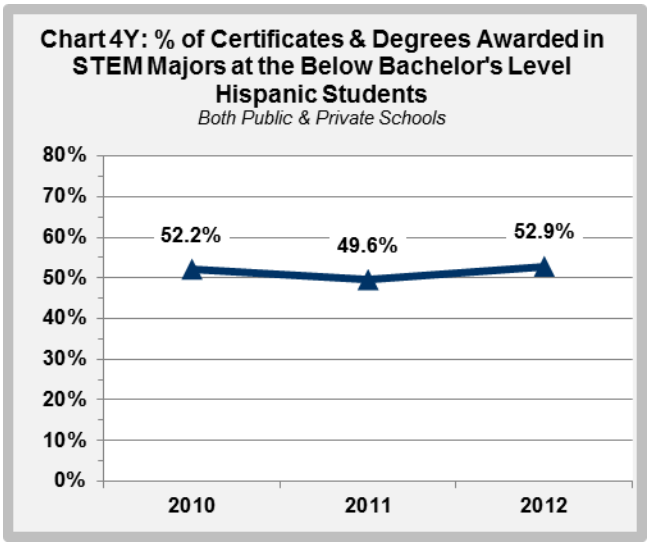


Chart 4Y: % of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
Hispanic Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
52.2%
49.6%
52.9%
2010
2011
2012

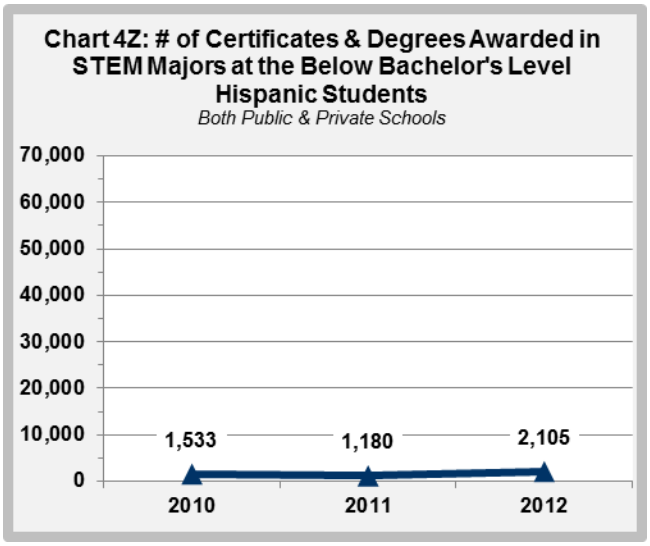


Chart 4Z: # of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
Hispanic Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1,533
1,180
2,105
2010
2011
2012

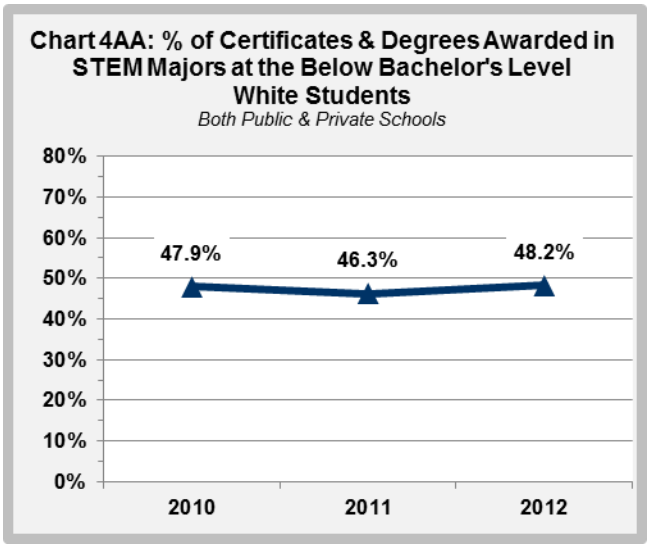


Chart 4AA: % of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
White Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
47.9%
46.3%
48.2%
2010
2011
2012

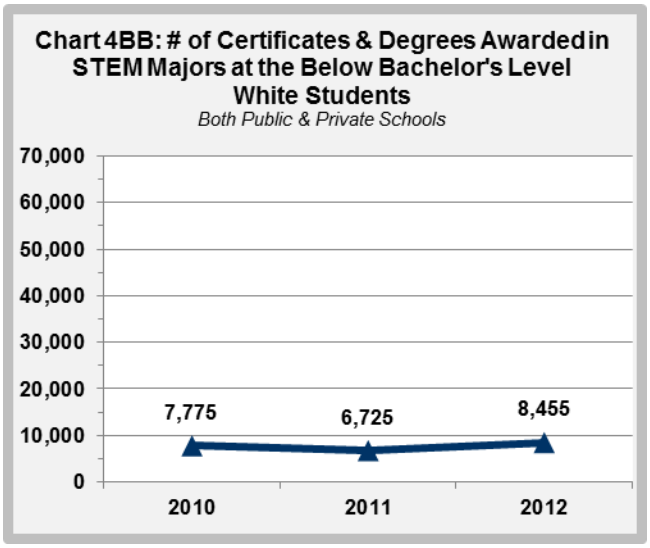


Chart 4BB: # of Certificates & Degrees Awarded in STEM Majors at the Below Bachelor's Level
White Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
7,775
6,725
8,455
2010
2011
2012

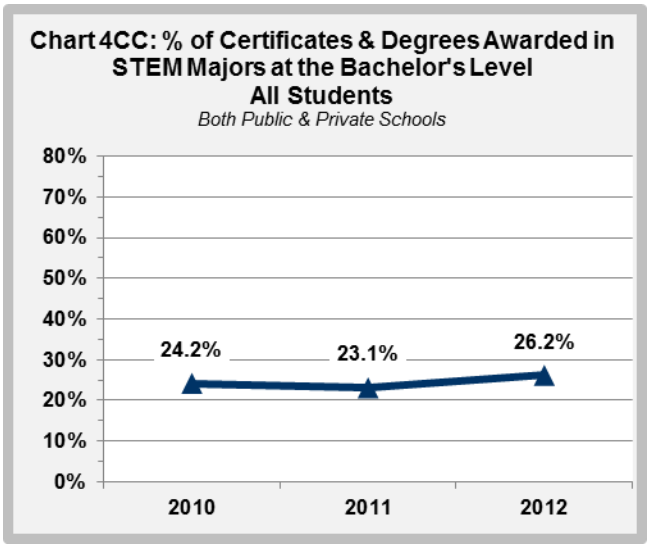


Chart 4CC: % of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
All Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
24.2%
23.1%
26.2%
2010
2011
2012

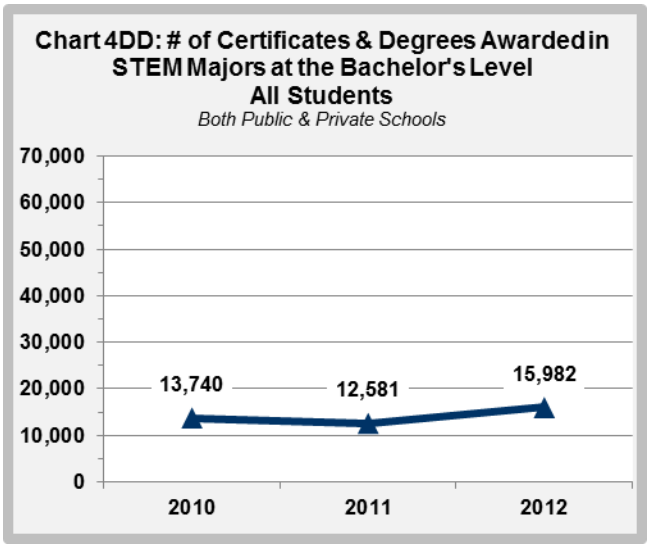


Chart 4DD: # of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
All Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
13,740
12,581
15,982
2010
2011
2012

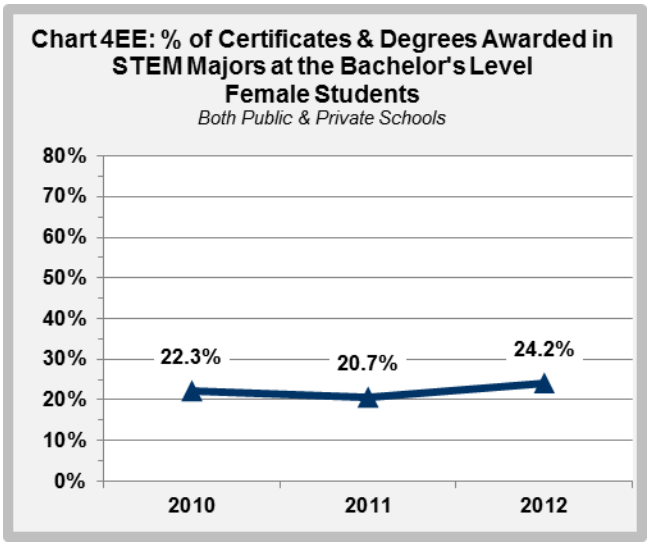


Chart 4EE: % of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Female Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
22.3%
20.7%
24.2%
2010
2011
2012

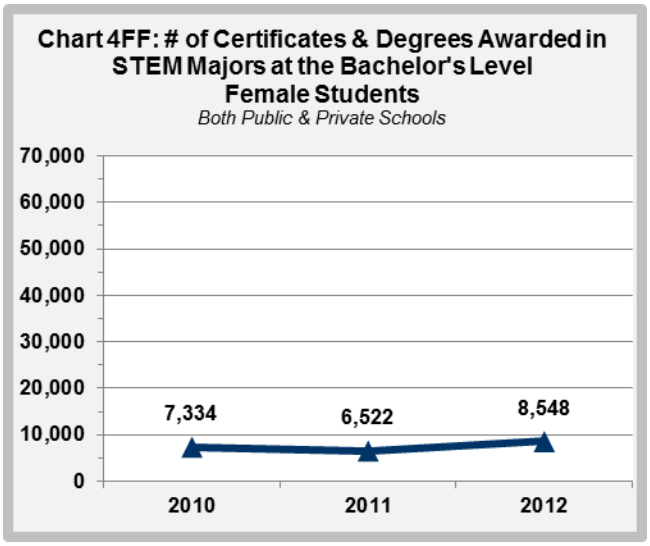


Chart 4FF: # of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Female Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
7,334
6,522
8,548
2010
2011
2012

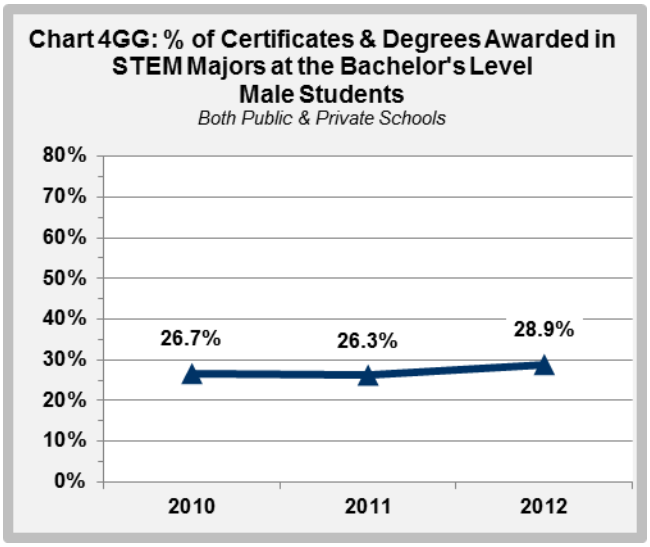


Chart 4GG: % of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Male Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
26.7%
26.3%
28.9%
2010
2011
2012

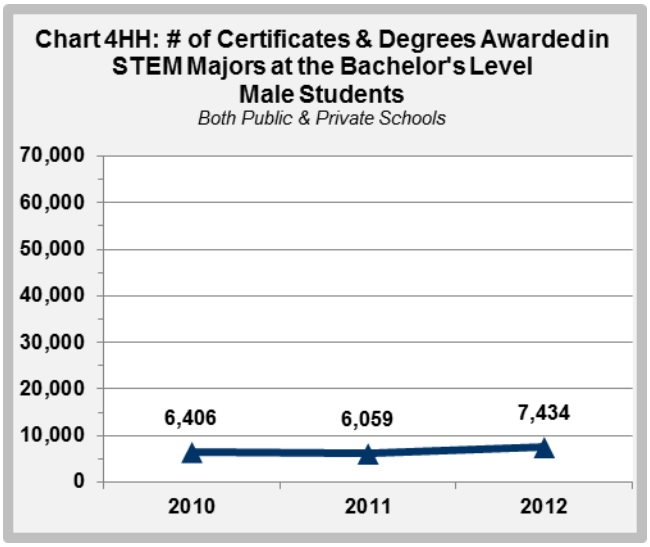


Chart 4HH: # of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Male Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
6,406
6,059
7,434
2010
2011
2012

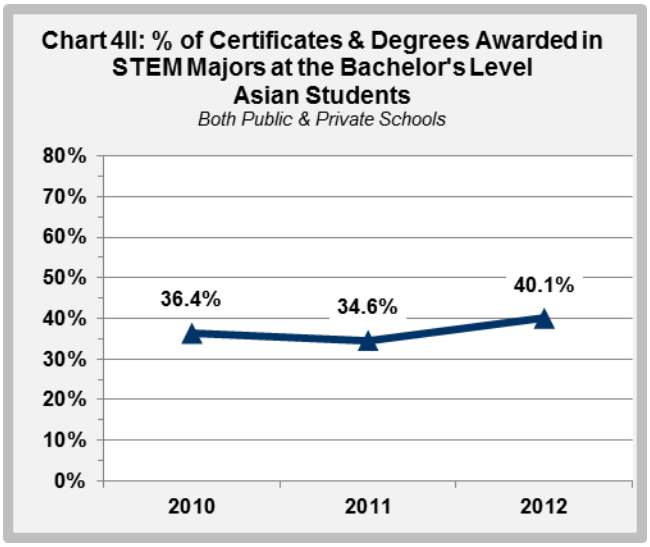


Chart 4II: % of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Asian Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
36.4%
34.6%
40.1%
2010
2011
2012

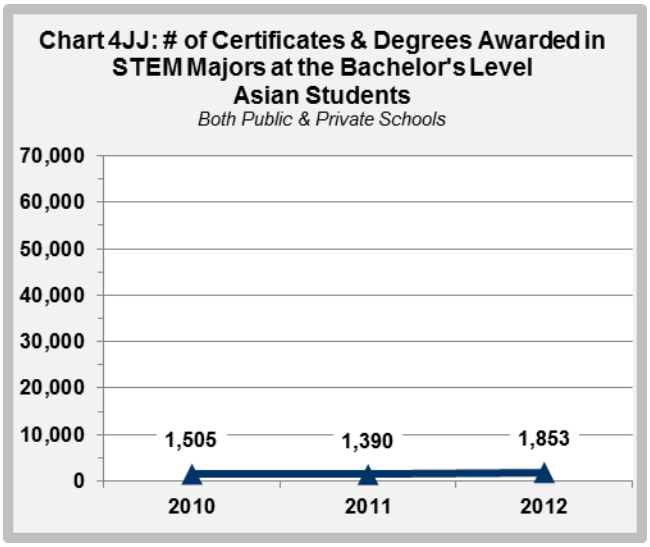


Chart 4JJ: # of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Asian Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1,505
1,390
1,853
2010
2011
2012

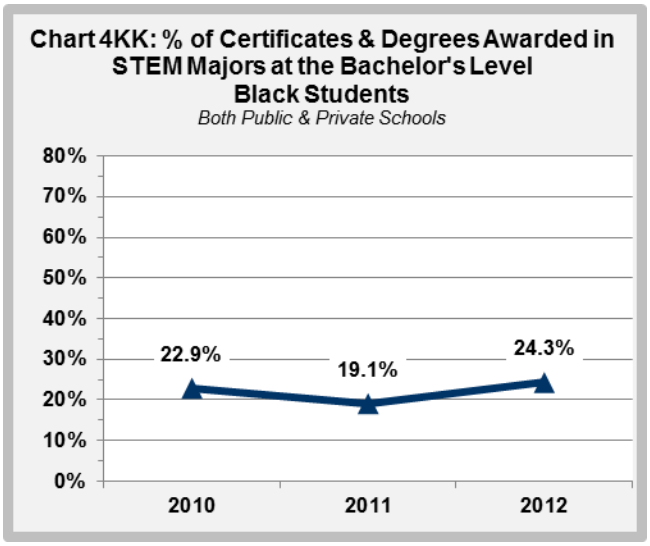


Chart 4KK: % of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Black Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
22.9%
19.1%
24.3%
2010
2011
2012

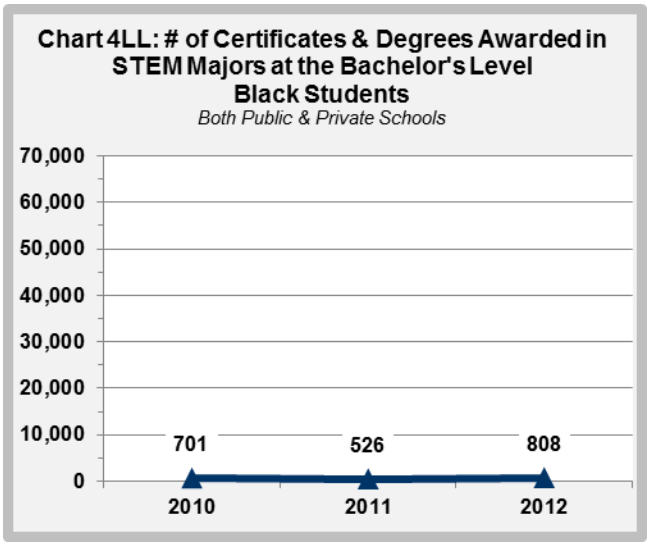


Chart 4LL: # of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Black Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
701
526
808
2010
2011
2012

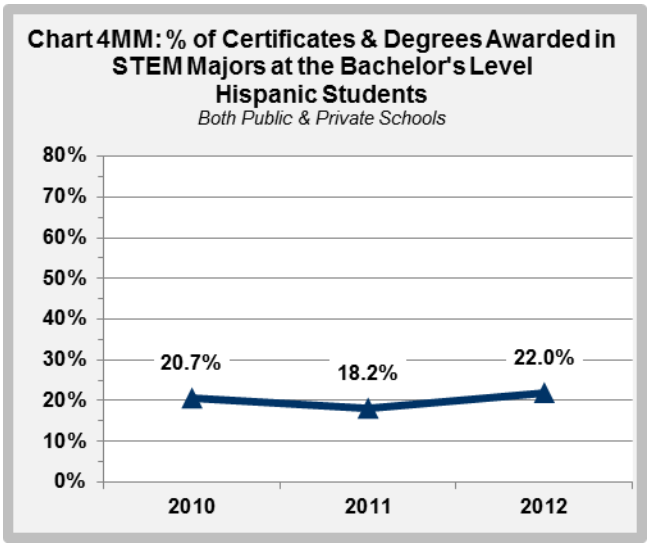


Chart 4MM: % of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Hispanic Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
20.7%
18.2%
22.0%
2010
2011
2012

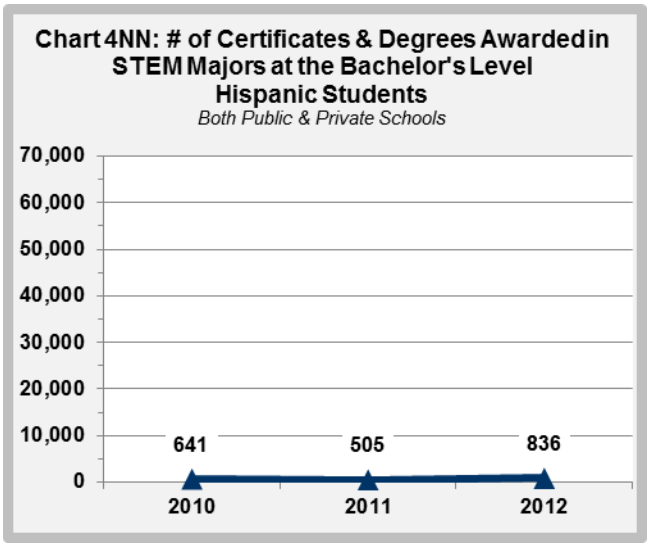


Chart 4NN: # of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
Hispanic Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
641
505
836
2010
2011
2012

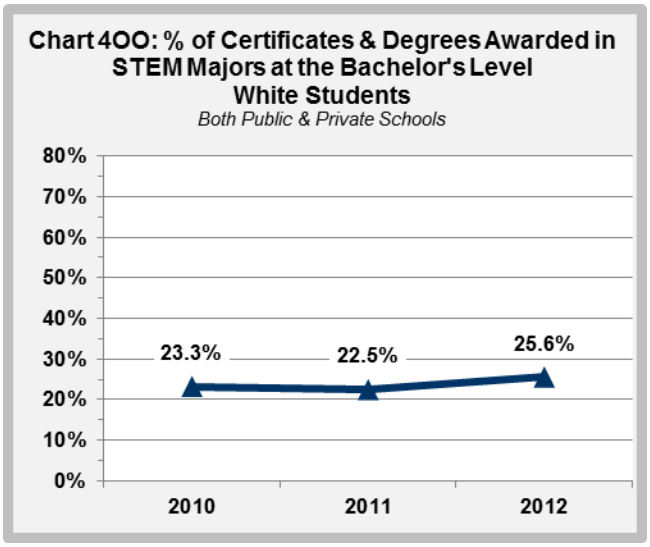


Chart 4OO: % of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
White Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
23.3%
22.5%
25.6%
2010
2011
2012

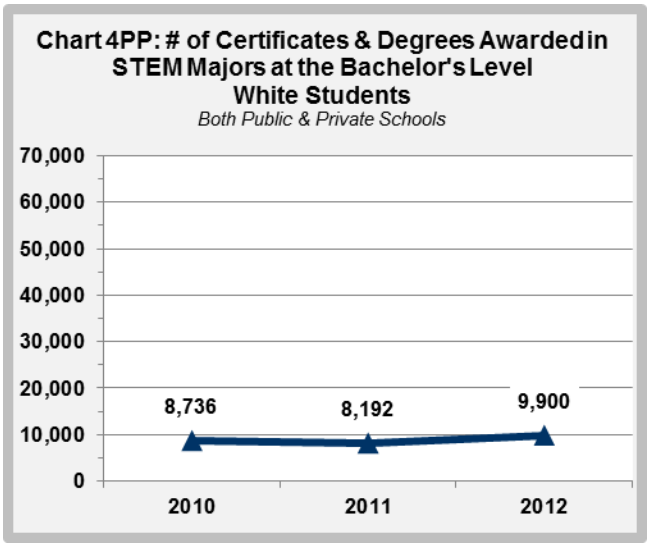


Chart 4PP: # of Certificates & Degrees Awarded in STEM Majors at the Bachelor's Level
White Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
8,736
8,192
9,900
2010
2011
2012

Chart 4QQ: % of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
All Students
Both Public & Private Schools

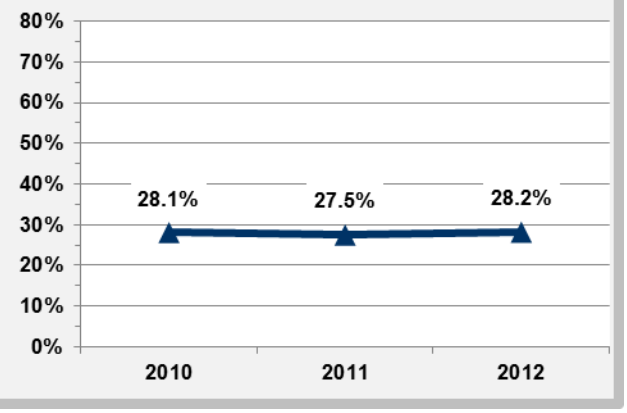


Chart 4RR: # of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
All Students
Both Public & Private Schools

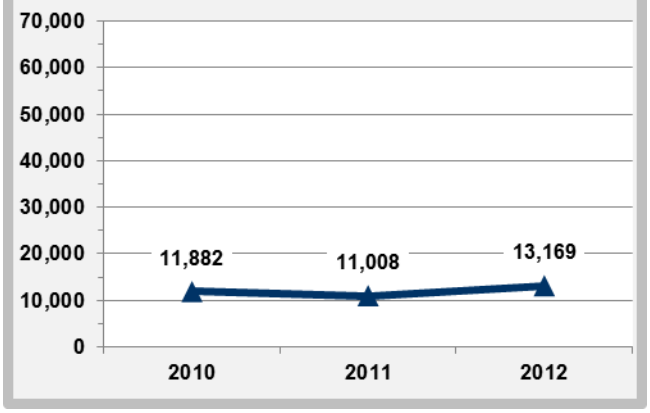


Chart 4SS: % of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Female Students
Both Public & Private Schools

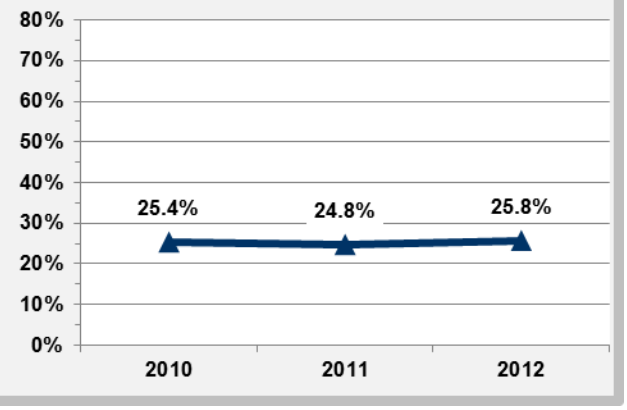


Chart 4TT: # of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Female Students
Both Public & Private Schools

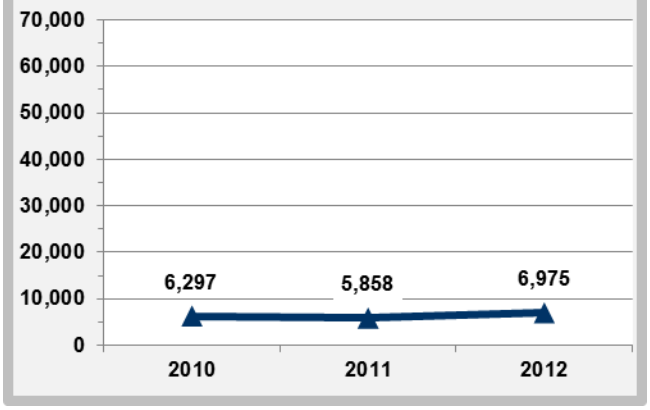


Chart 4UU: % of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Male Students
Both Public & Private Schools

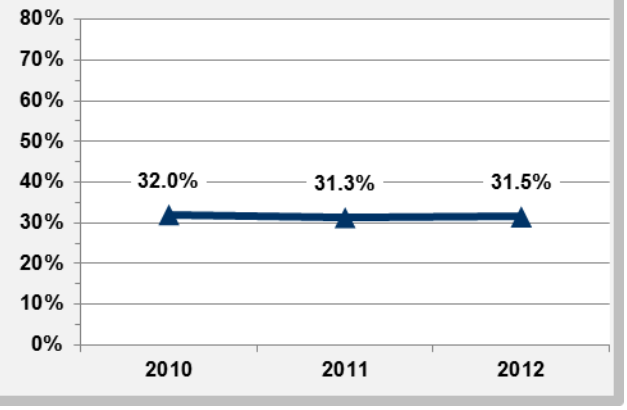
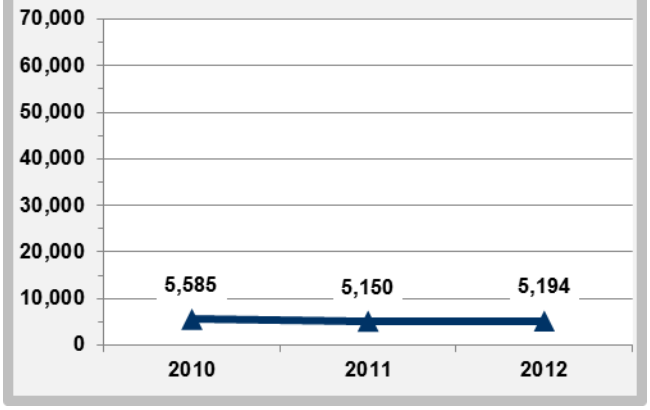


Chart 4VV: # of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Male Students
Both Public & Private Schools



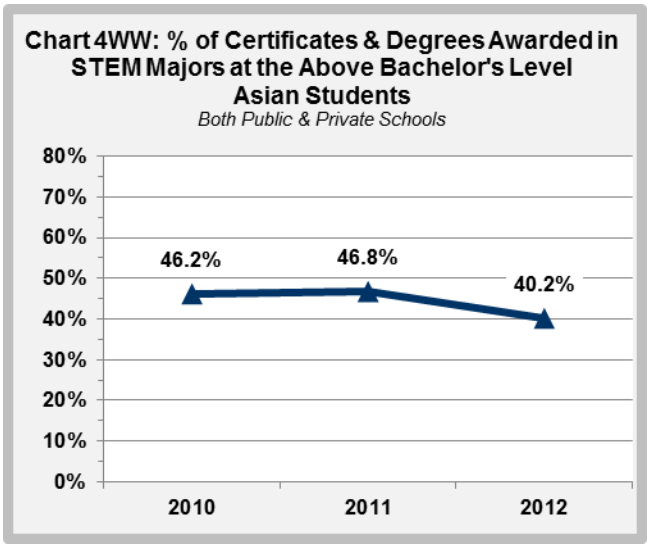


Chart 4WW: % of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Asian Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
46.2%
46.8%
40.2%
2010
2011
2012

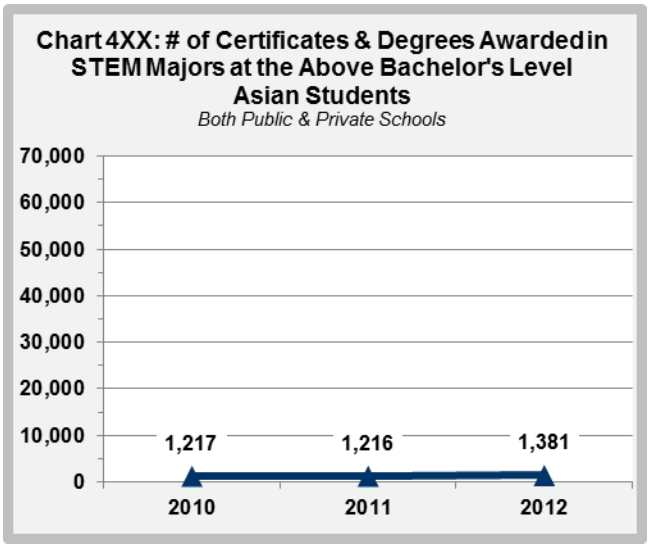


Chart 4XX: # of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Asian Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1,217
1,216
1,381
2010
2011
2012

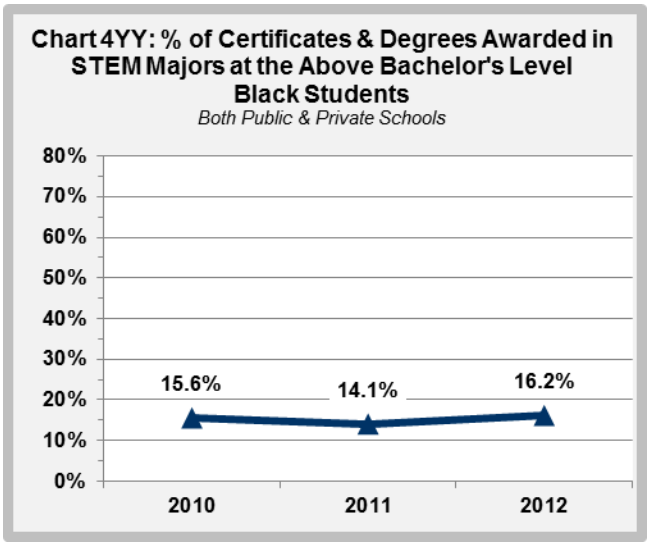


Chart 4YY: % of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Black Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
15.6%
14.1%
16.2%
2010
2011
2012

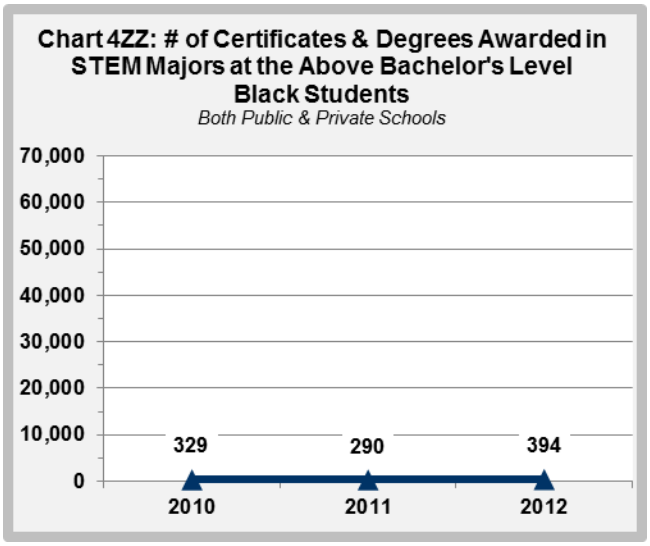


Chart 4ZZ: # of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Black Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
329
290
394
2010
2011
2012

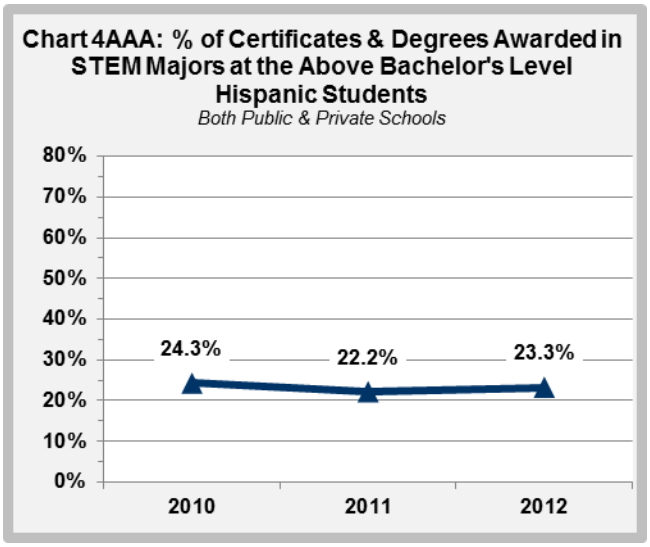


Chart 4AAA: % of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Hispanic Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
24.3%
22.2%
23.3%
2010
2011
2012

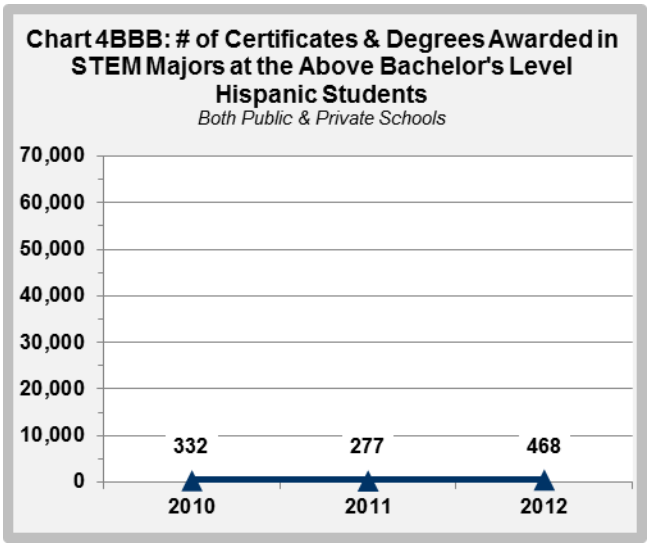


Chart 4BBB: # of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
Hispanic Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
332
277
468
2010
2011
2012

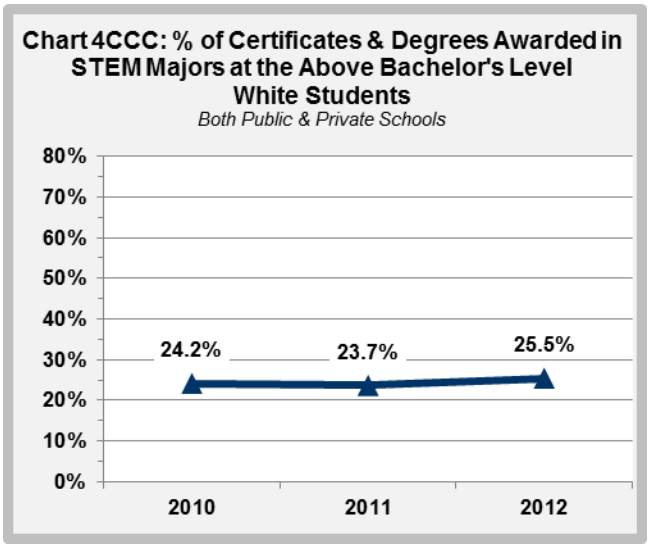


Chart 4CCC: % of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
White Students
Both Public & Private Schools
80%
70%
60%
50%
40%
30%
20%
10%
0%
24.2%
23.7%
25.5%
2010
2011
2012

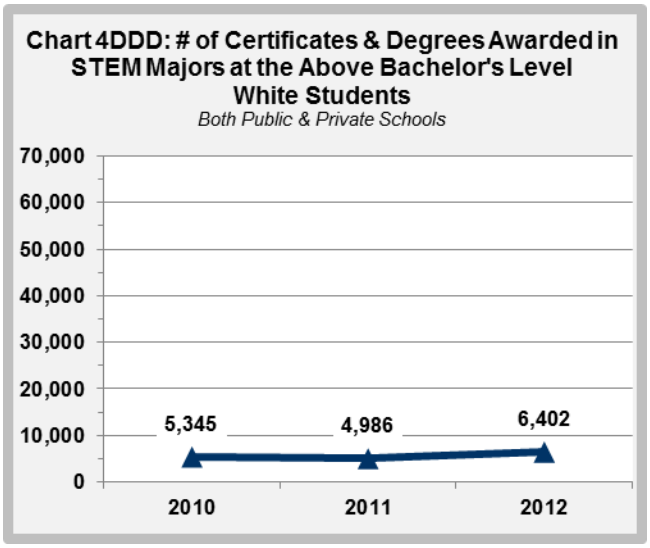


Chart 4DDD: # of Certificates & Degrees Awarded in STEM Majors at the Above Bachelor's Level
White Students
Both Public & Private Schools
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
5,345
4,986
6,402
2010
2011
2012

Goal 5 Indicators: STEM Post-Secondary Education-Workforce Alignment

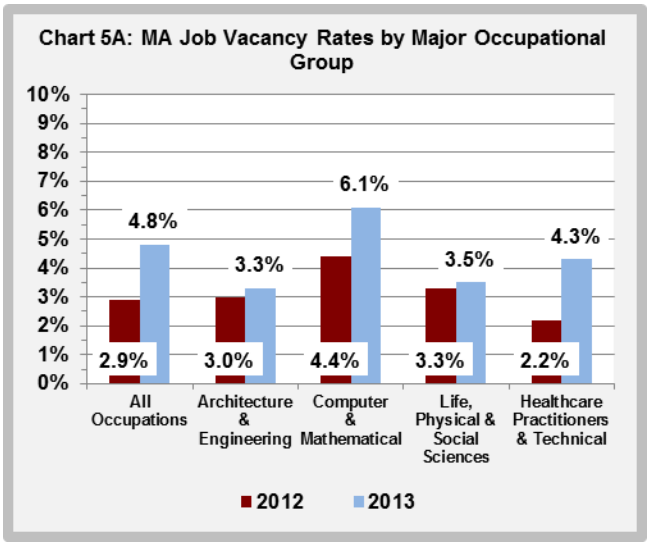


Chart 5A: MA Job Vacancy Rates by Major Occupational Group
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
4.8%
3.3%
6.1%
3.5%
4.3%
2.9%
3.0%
4.4%
3.3%
2.2%
All Occupations
Architecture & Engineering
Computer & Mathematical
Life, Physical & Social Sciences
Healthcare Practitioners & Technical
2012
2013

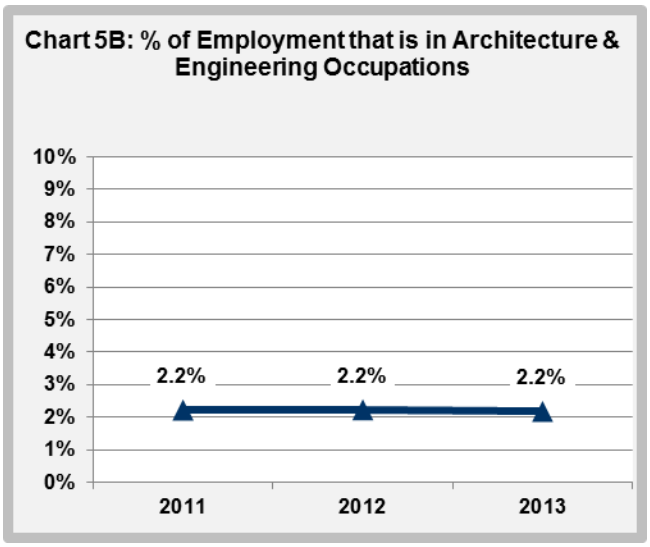


Chart 5B: % of Employment that is in Architecture & Engineering Occupations
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
2.2%
2.2%
2.2%
2011
2012
2013

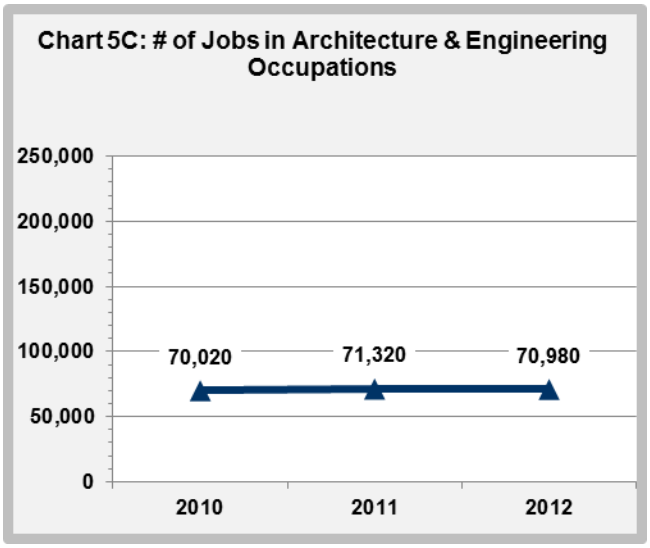


Chart 5C: # of Jobs in Architecture & Engineering Occupations
250,000
200,000
150,000
100,000
50,000
0
70,020
71,320
70,980
2010
2011
2012

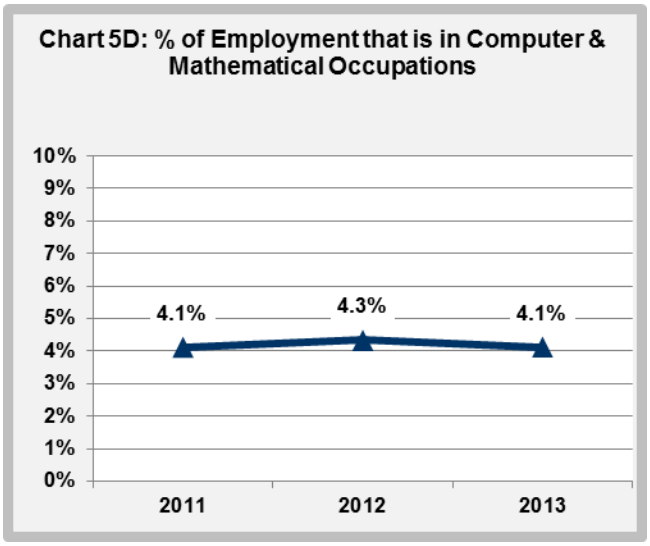


Chart 5D: % of Employment that is in Computer & Mathematical Occupations
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
4.1%
4.3%
4.1%
2011
2012
2013

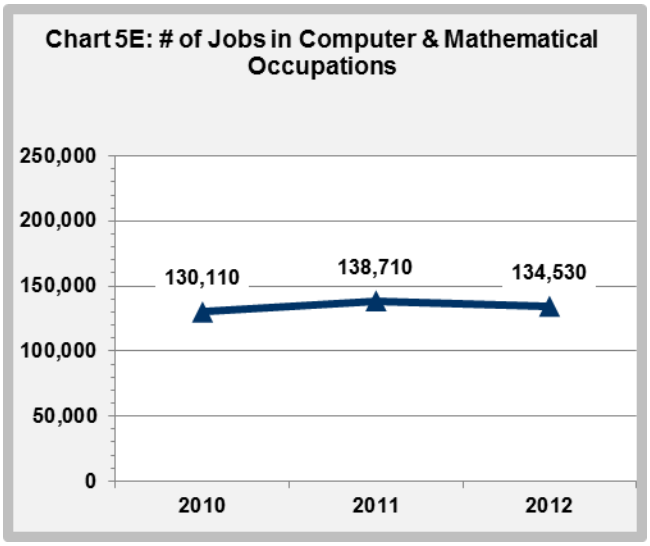


Chart 5E: # of Jobs in Computer & Mathematical Occupations
250,000
200,000
150,000
100,000
50,000
0
130,110
138,710
134,530
2010
2011
2012

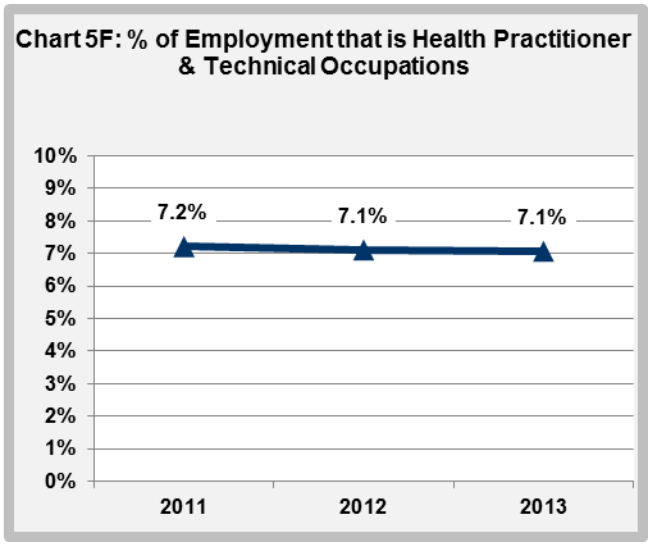


Chart 5F: % of Employment that is Health Practitioner & Technical Occupations
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
7.2%
7.1%
7.1%
2011
2012
2013

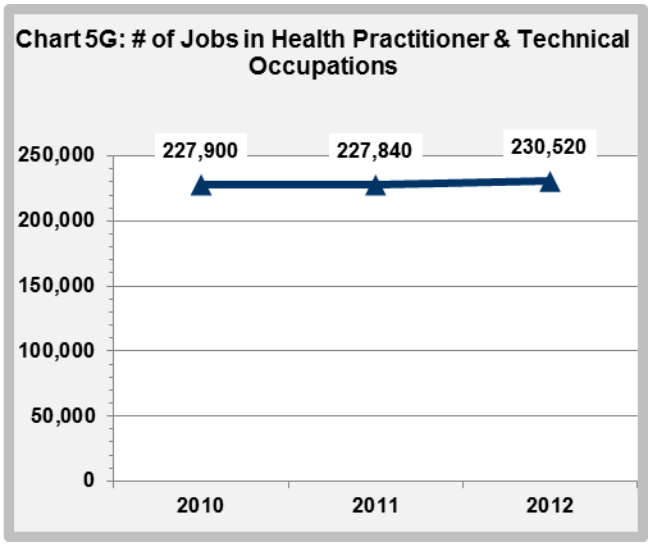


Chart 5G: # of Jobs in Health Practitioner & Technical Occupations
250,000
200,000
150,000
100,000
50,000
0
227,900
227,840
230,520
2010
2011
2012

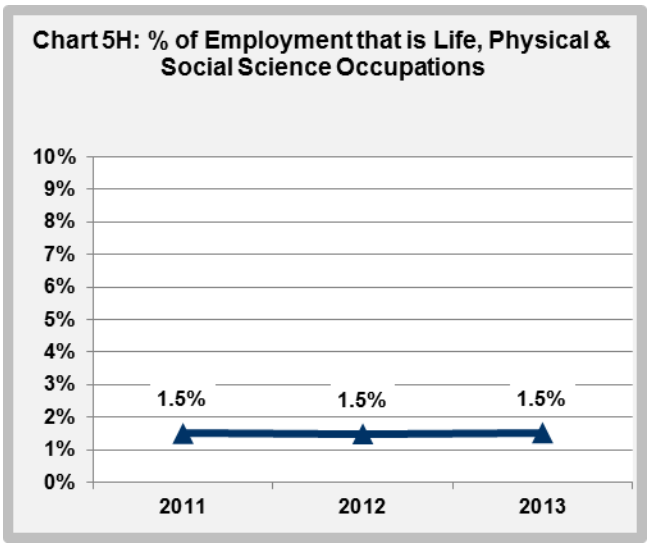


Chart 5H: % of Employment that is Life, Physical & Social Science Occupations
10%
9%
8%
7%
6%
5%
4%
3%
2%
1%
0%
1.5%
1.5%
1.5%
2011
2012
2013

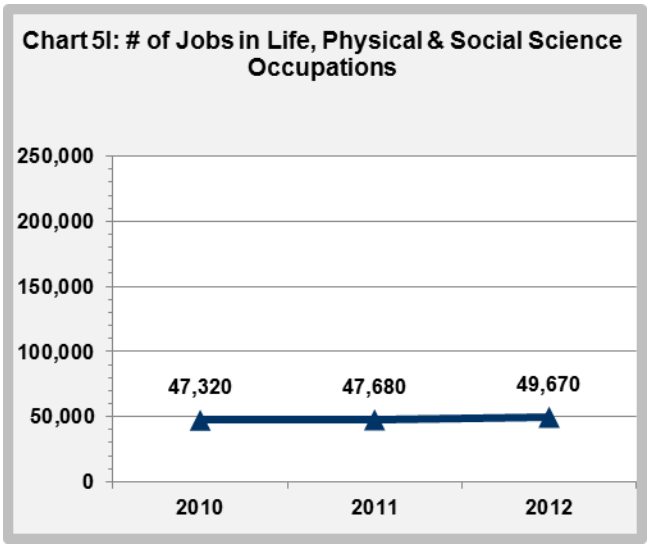


Chart 5I: # of Jobs in Life, Physical & Social Science Occupations
250,000
200,000
150,000
100,000
50,000
0
47,320
47,680
49,670
2010
2011
2012

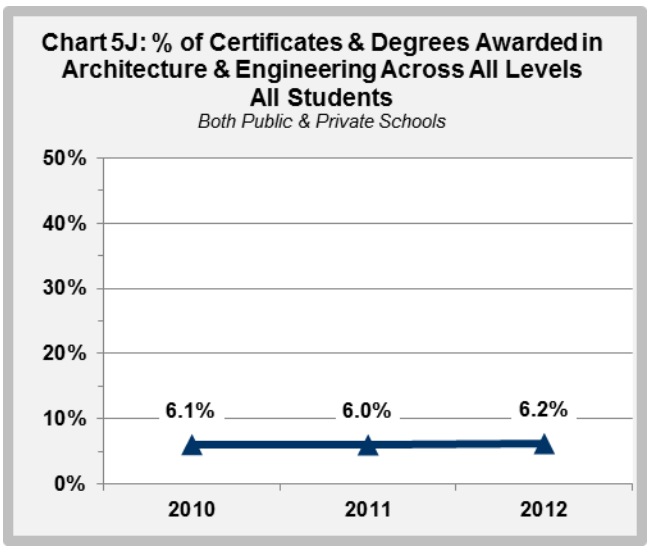


Chart 5J: % of Certificates & Degrees Awarded in Architecture & Engineering Across All Levels
All Students
Both Public & Private Schools
50%
40%
30%
20%
10%
0%
6.1%
6.0%
6.2%
2010
2011
2012

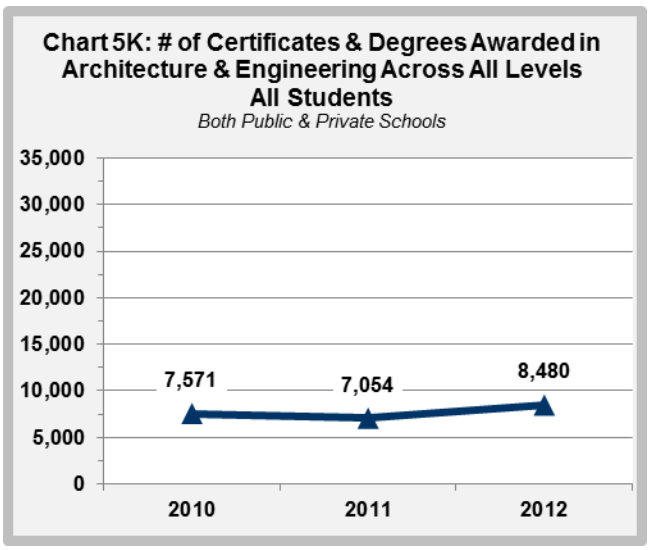


Chart 5K: # of Certificates & Degrees Awarded in Architecture & Engineering Across All Levels
All Students
Both Public & Private Schools
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
7,571
7,054
8,480
2010
2011
2012

Chart 5L: % of Certificates & Degrees Awarded in Computer Science & Mathematics Across All Levels
All Students
Both Public & Private Schools

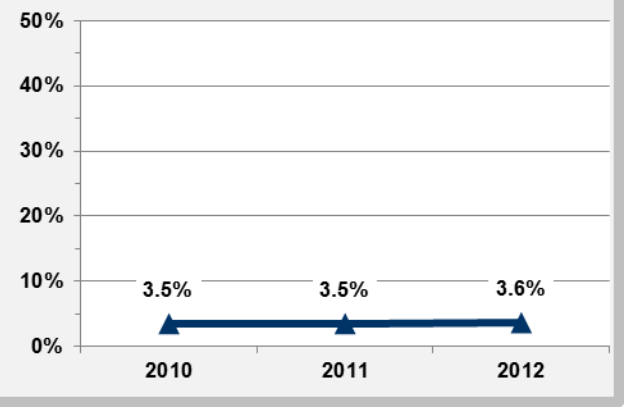


Chart 5M: # of Certificates & Degrees Awarded in Computer Science Across All Levels
All Students
Both Public & Private Schools

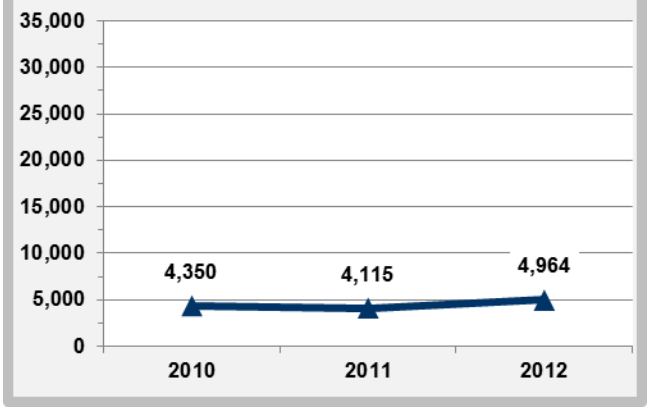


Chart 5N: % of Certificates & Degrees Awarded in Health Professions Across All Levels
All Students
Both Public & Private Schools

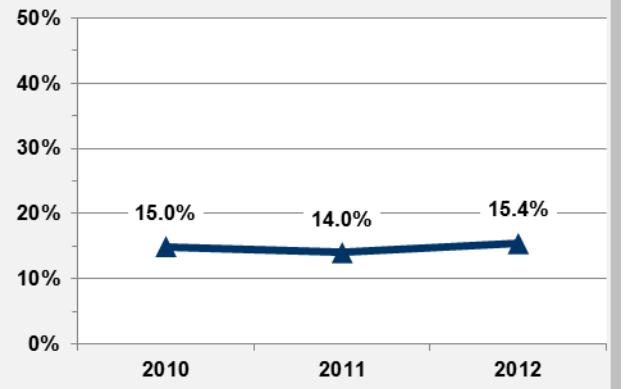


Chart 5O: # of Certificates & Degrees Awarded in Health Professions Across All Levels
All Students
Both Public & Private Schools

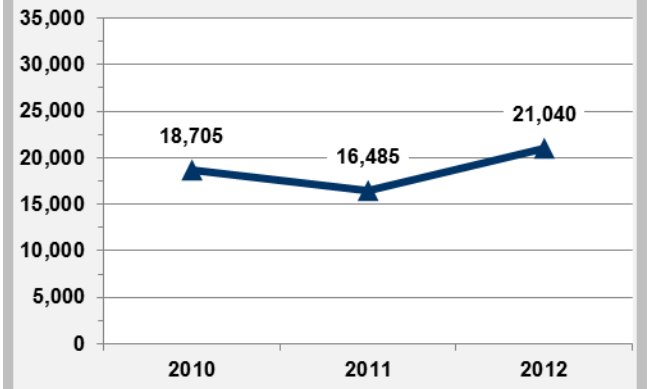


Chart 5P: % of Certificates & Degrees Awarded in Life & Physical Sciences Across All Levels
All Students
Both Public & Private Schools

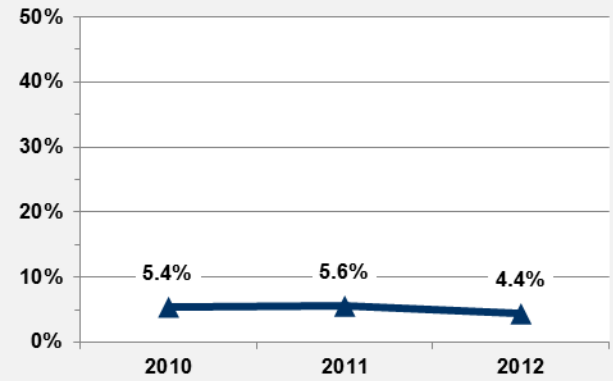


Chart 5Q: # of Certificates & Degrees Awarded in Life & Physical Sciences Across All Levels
All Students
Both Public & Private Schools

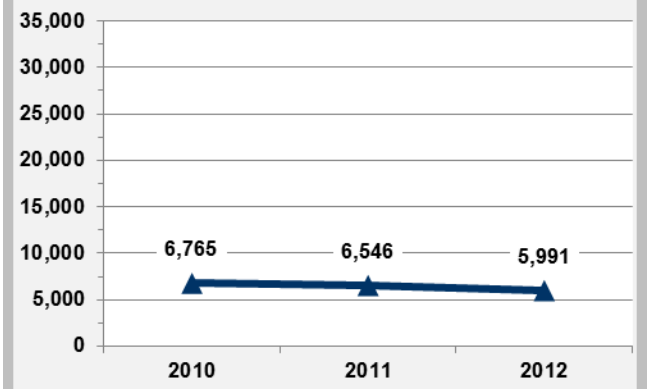


Chart 5R: % of Certificates & Degrees Awarded in Architecture & Engineering at the Below Bachelor's Level - All Students
Both Public & Private Schools

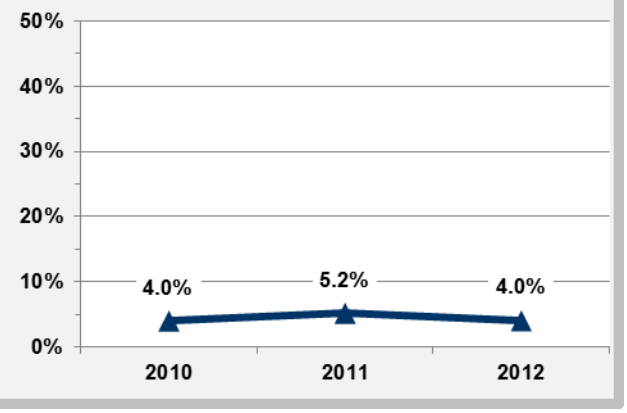


Chart 5S: # of Certificates & Degrees Awarded in Architecture & Engineering at the Below Bachelor's Level - All Students
Both Public & Private Schools

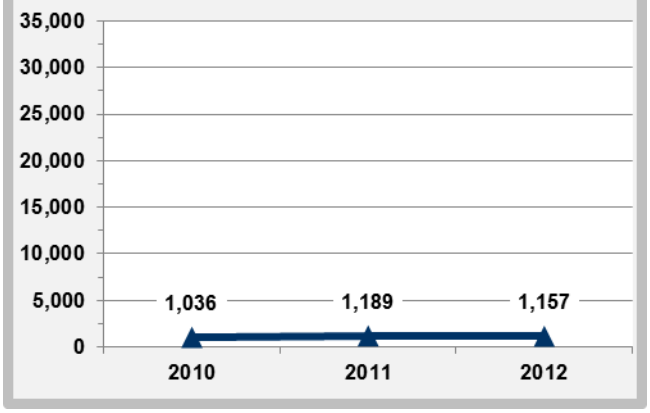


Chart 5T: % of Certificates & Degrees Awarded in Computer Science & Mathematics at the Below Bachelor's Level - All Students
Both Public & Private Schools

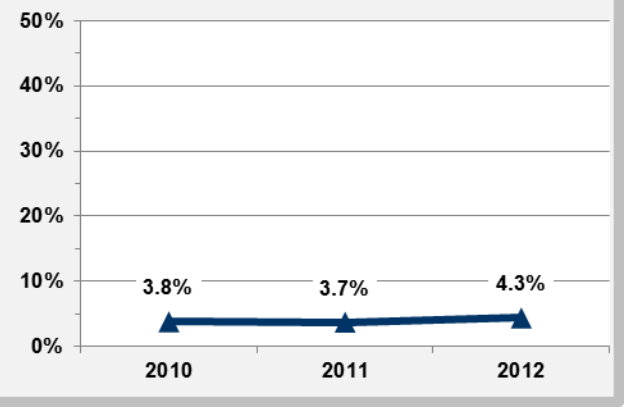


Chart 5U: # of Certificates & Degrees Awarded in Computer Science at the Below Bachelor's Level All Students
Both Public & Private Schools

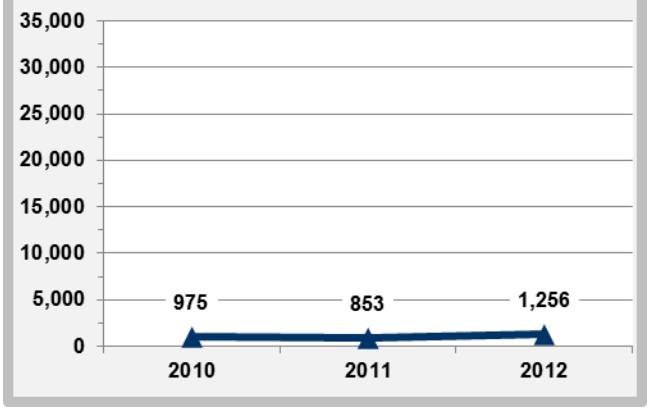


Chart 5V: % of Certificates & Degrees Awarded in Health Professions at the Below Bachelor's Level All Students
Both Public & Private Schools

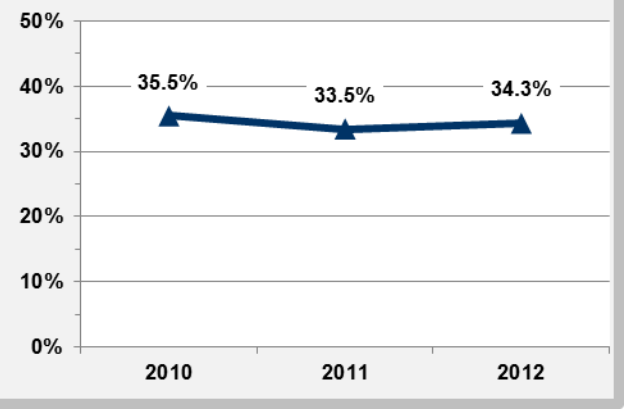


Chart 5W: # of Certificates & Degrees Awarded in Health Professions at the Below Bachelor's Level All Students
Both Public & Private Schools

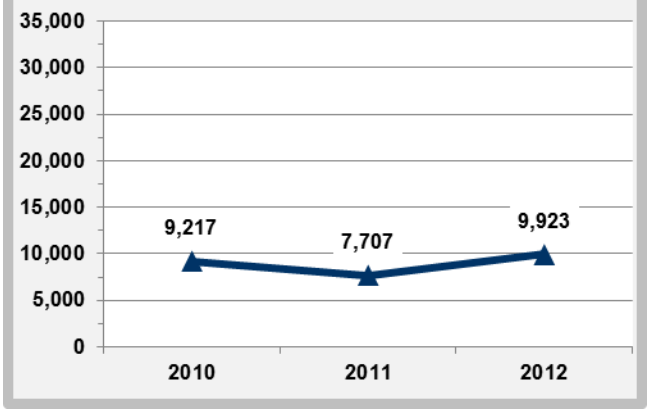


Chart 5X: % of Certificates & Degrees Awarded in Life & Physical Sciences at the Below Bachelor's Level All Students
Both Public & Private Schools

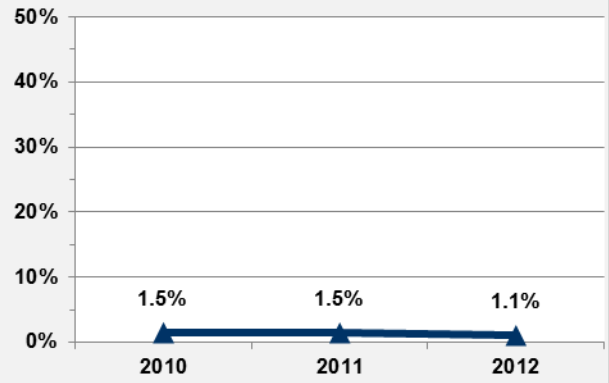


Chart 5Y: # of Certificates & Degrees Awarded in Life & Physical Sciences at the Below Bachelor's Level All Students
Both Public & Private Schools

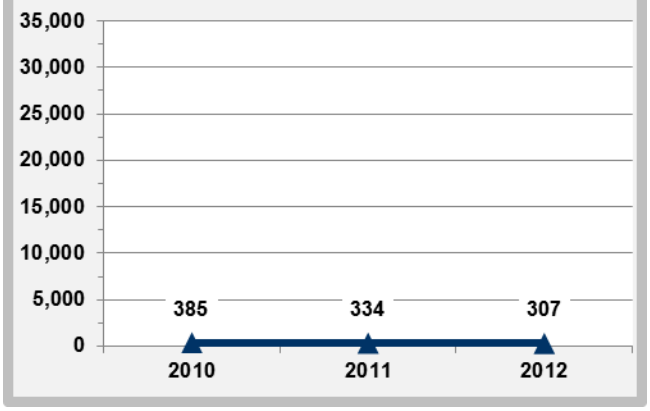


Chart 5Z: % of Certificates & Degrees Awarded in Architecture & Engineering at the Bachelor's Level - All Students
Both Public & Private Schools

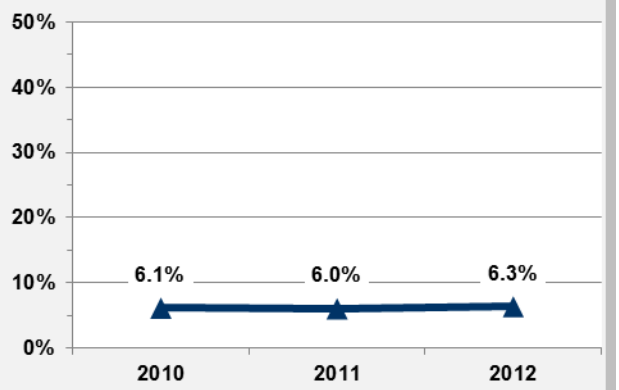


Chart 5AA: # of Certificates & Degrees Awarded in Architecture & Engineering at the Bachelor's Level - All Students
Both Public & Private Schools

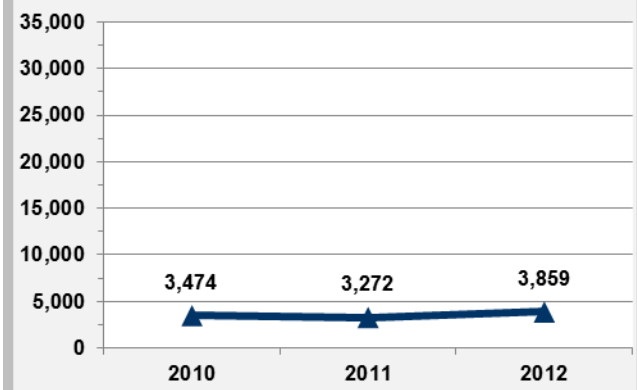


Chart 5BB: % of Certificates & Degrees Awarded in Computer Science & Mathematics at the Bachelor's Level - All Students
Both Public & Private Schools

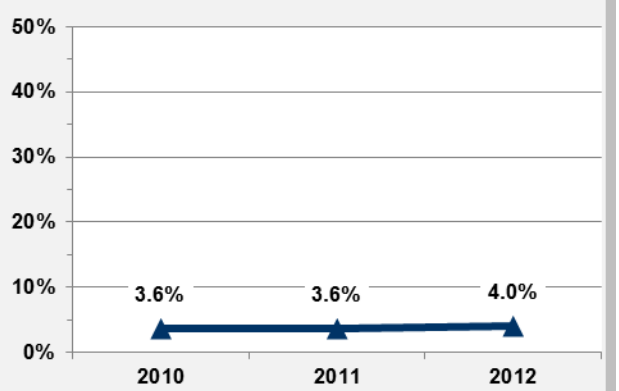


Chart 5CC: # of Certificates & Degrees Awarded in Computer Science at the Bachelor's Level All Students
Both Public & Private Schools

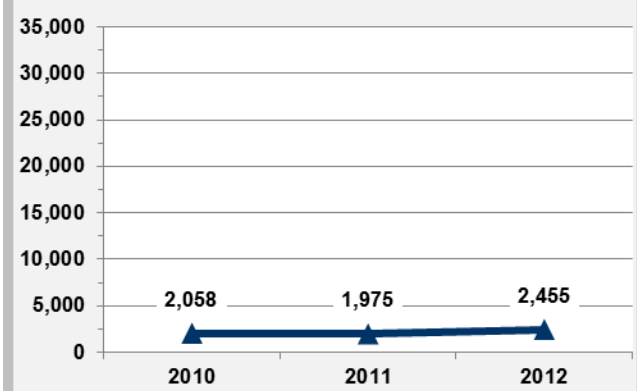


Chart 5DD: % of Certificates & Degrees Awarded in Health Professions at the Bachelor's Level All Students
Both Public & Private Schools

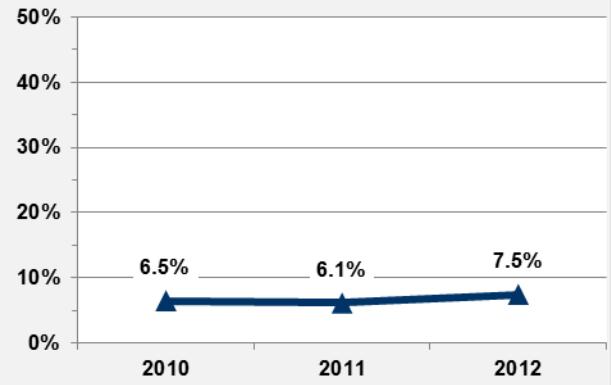


Chart 5EE: # of Certificates & Degrees Awarded in Health Professions at the Bachelor's Level All Students
Both Public & Private Schools

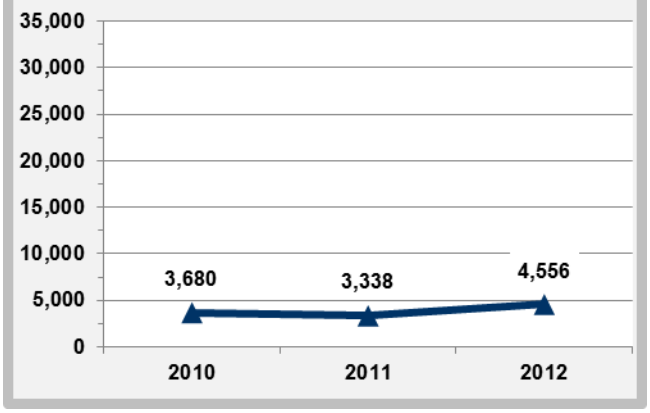


Chart 5FF: % of Certificates & Degrees Awarded in Life & Physical Sciences at the Bachelor's Level All Students
Both Public & Private Schools

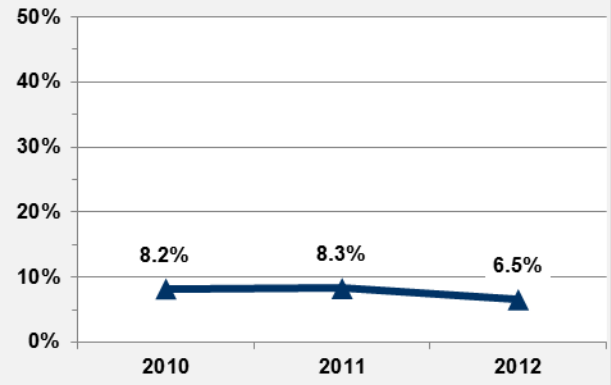


Chart 5GG: # of Certificates & Degrees Awarded in Life & Physical Sciences at the Bachelor's Level All Students
Both Public & Private Schools

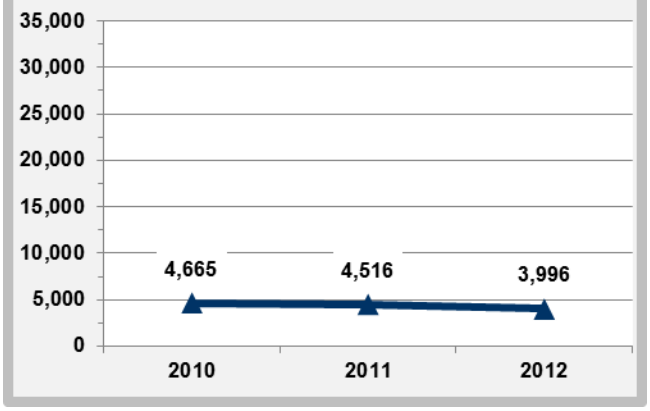


Chart 5HH % of Certificates & Degrees Awarded in Architecture & Engineering at the Above Bachelor's Level - All Students
Both Public & Private Schools

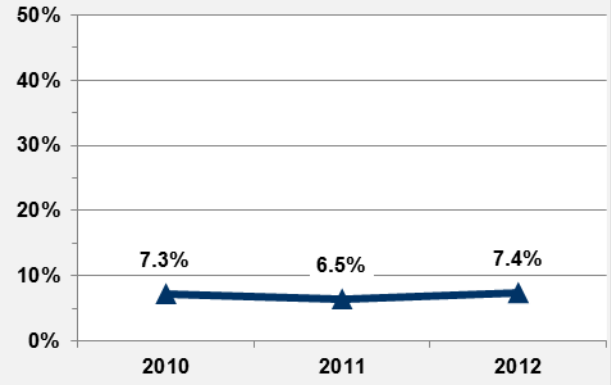


Chart 5II: # of Certificates & Degrees Awarded in Architecture & Engineering at the Above Bachelor's Level - All Students
Both Public & Private Schools

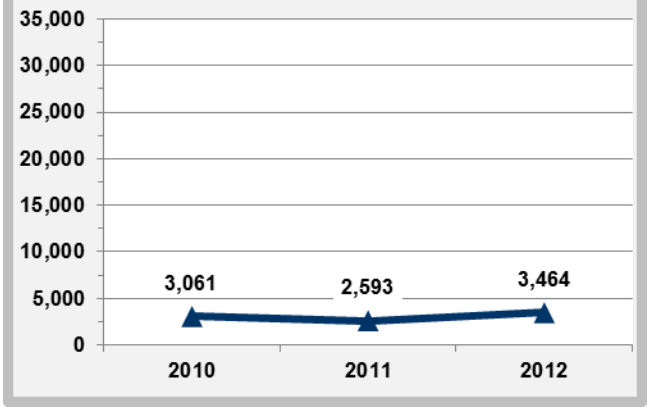


Chart 5JJ: % of Certificates & Degrees Awarded in Computer Science & Mathematics at the Above Bachelor's Level - All Students
Both Public & Private Schools

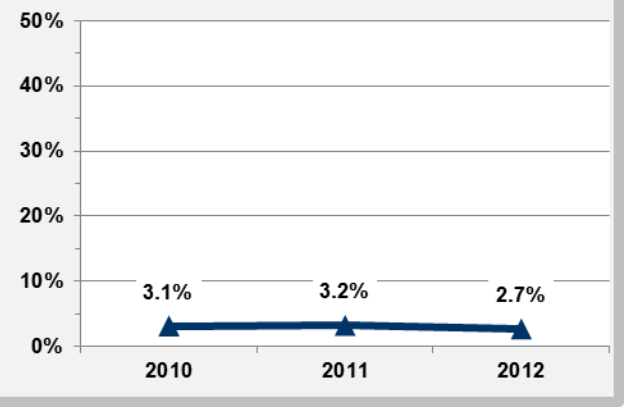


Chart 5KK: # of Certificates & Degrees Awarded in Computer Science at the Above Bachelor's Level All Students
Both Public & Private Schools

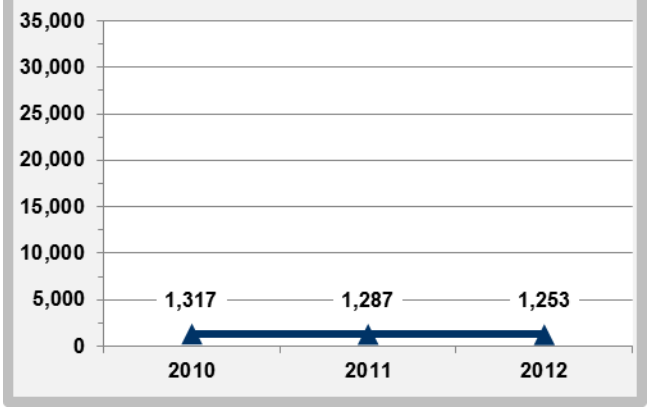


Chart 5LL: % of Certificates & Degrees Awarded in Health Professions at the Above Bachelor's Level All Students
Both Public & Private Schools

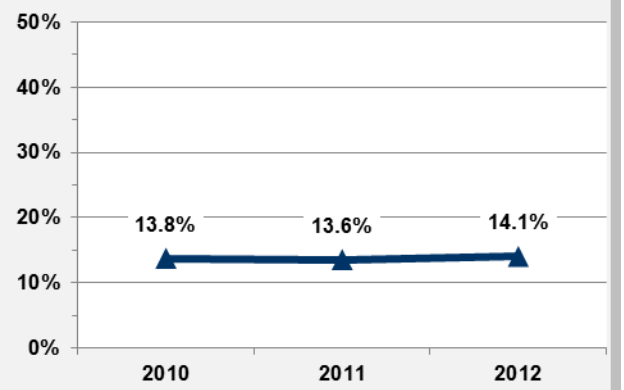


Chart 5MM: # of Certificates & Degrees Awarded in Health Professions at the Above Bachelor's Level All Students
Both Public & Private Schools

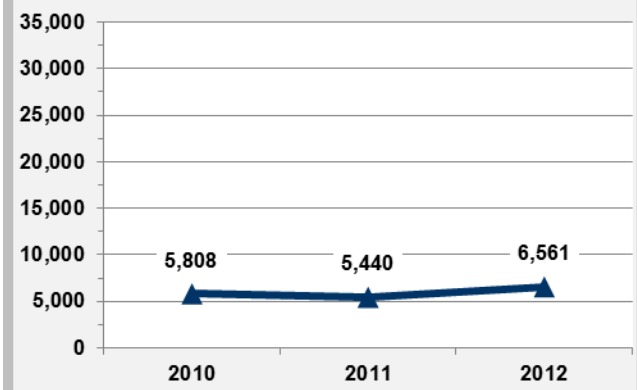


Chart 5NN: % of Certificates & Degrees Awarded in Life & Physical Sciences at the Above Bachelor's Level - All Students
Both Public & Private Schools

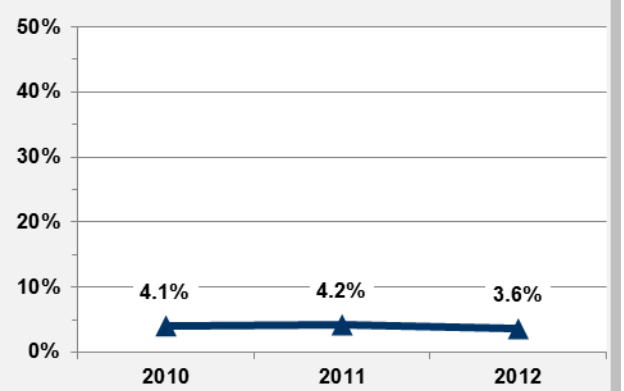
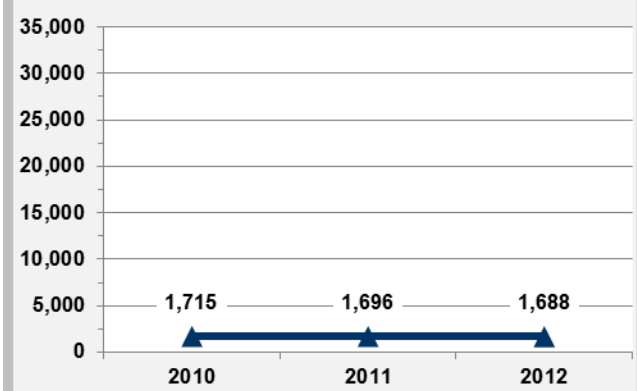


Chart 5OO: # of Certificates & Degrees Awarded in Life & Physical Sciences at the Above Bachelor's Level - All Students
Both Public & Private Schools



Data Notes

Source 1: SAT Registration Questionnaire

Data used for these charts consisted of individual responses by MA public school graduates to the questions on the registration questionnaire, including graduating cohorts 2007–2013. See Appendix A for the full questionnaire, including a list of college majors from which respondents can choose. Majors included as STEM are highlighted.

Data are obtained by the UMass Donahue Institute directly from the College Board through a data sharing agreement. This data sharing agreement also includes the MA Department of Higher Education and the MA Department of Elementary and Secondary Education. The data sharing agreement stipulates that the minimum N for any public reporting must be six (6), whether students, schools, or districts (whatever the operative level of analysis is).

Information related to interest in STEM college majors, as well as STEM course-taking in high school, are all self-reported by students. In some cases, if a student took the SAT as a junior, they are projecting what courses they intend to take during their senior year, rather than reporting on actual courses taken.

Approximate N of whole dataset is 330,000. The College Board estimates that 80% of all MA public school students take the SAT prior to graduating. However, it should be noted that the percentage of students who take the test varies widely by individual school. In cases such as the vocational schools, the percentage of students who take the SAT is frequently less than 50% of the graduating cohort, while in high-performing/high-income schools, the percentage of students who take the SAT is frequently 100%. As a result, charts based on this data source are only reflective of SAT test-takers, and not necessarily of all public school students.

Girls are overrepresented in the dataset, in comparison to the MA public school population as a whole. For example, for the 2011–2012 school year, the MA public school population was approximately 51% male and 49% female. However, the 2012 SAT test-taking cohort was 46% male and 54% female. This discrepancy in gender balance, however, is in line with general high school population versus college-going population patterns in both Massachusetts and the nation as a whole. Of SAT test-takers, 99.9% identify their gender.

The SAT includes a variable for whether a test-taker receives a waiver for the cost of the test (called the "fee-waiver variable"). Information on which test-takers qualify for the fee waiver can be found at http://sat.collegeboard.org/register/sat-fee-waivers. This variable has only been included in our dataset since 2011. For the graduating cohorts of 2011 and 2012, approximately 20% of the test-takers each year received a fee waiver. We use the fee waiver variable as a proxy for low-income status, as income is the dominant criteria for receiving one. However, just because a test-taker did not receive a fee waiver does not necessarily mean that they are high income. There could be cases of low-income students who did not apply to receive fee waivers because their testing costs were covered by other agencies. While this variable has limitations, and is only a proxy, it does indicate that low-income students are likely underrepresented in the SAT test-taker population compared to higher income students. For example, for the 2011–2012 school year, approximately 35% of MA public school students were officially categorized as "low income" (meaning they qualified for the federal free or reduced price lunch program).

On the registration questionnaire, test-takers are able to self-identify their race/ethnicity using the following options: (1) American Indian or Alaska Native, (2) Asian, Asian-American, or Pacific Islander, (3) Black or

African-American, (4) Mexican or Mexican-American, (5) Puerto Rican, (6) Other Hispanic, Latino, or Latin American, (7) White, and (8) Other. This is a single-choice/forced-option question: test-takers cannot choose more than one answer. For racial/ethnic analysis of the SAT data, test-takers were grouped into two categories: white and non-white. "White" was defined simply as test-takers who self-identified as "white" for the race/ethnicity question. "Non-white" was defined simply as all other test-takers who responded to the race/ethnicity question (test-takers who did not respond to the race/ethnicity questions were not included in any race/ethnicity analysis). On average, for all of the years covered by our dataset, 96% of test-takers respond to the race/ethnicity question. Similar to the income demographics, white SAT test-takers are overrepresented in comparison to the MA public school student population as a whole. For the 2011–2012 school year, approximately 67% of the MA public school population was officially identified as "white," compared to about 75% of the SAT test-taking population.

STEM interest, for the purposes of this report, has been defined as SAT test-takers' first choice for a college major (see question #21 on the registration questionnaire). As mentioned in the Introduction, we have defined STEM as including the following fields: (1) Agriculture, Conservation, and Natural Resources, (2) Architecture, (3) Biological and Biomedical Sciences, (4) Computer and Information Sciences, (5) Engineering and Engineering Technologies/Technicians, (6) Health Professions and Clinical Sciences, (7) Mathematics and Statistics, (8) Mechanic and Repair Technologies/Technicians, (9) Military Technologies/Technicians, (10) Physical Sciences, (11) Precision Production, and (12) Science Technologies/Technicians. On average, over the years included in our dataset, 86% of test-takers have responded to the question about their first choice for a college major. The SAT college major variable we receive from the College Board is coded with the specific major identifying code each test-taker lists. We then categorize these specific codes into groups of majors (i.e., "computer & information sciences, mathematics & statistics, engineering, and engineering technologies/technicians"), as well as "STEM" or "non-STEM," for our analysis.

The 12 major categories listed above have been collapsed into only 6 primary STEM groups for this report, as follows:

I. "Architecture and Engineering" = Architecture, Engineering, and Engineering Technologies/Technicians
II. "Computers and Math" = Computer & Information Sciences, and Mathematics & Statistics
III. "Health" = Health Professions & Clinical Sciences
IV. "Life & Physical Sciences" = Agriculture, Conservation, & Natural Resources, Biological & Biomedical Sciences, Physical Sciences, and Science Technologies/Technicians
V. "Other STEM" = Mechanic and Repair Technologies/Technicians, Military Technologies/Technicians, and Precision Production

Majors were grouped in this fashion so that information could be presented in a manner parallel to data from other sources, most notably the occupational groups used by the Bureau of Labor Statistics and the American Community Survey.

The SAT asks test-takers to self-report which classes students took during high school and when. For example, a test-taker can list that they took Algebra in 9th grade, Geometry in 10th, Algebra II in 11th, and Pre-calculus in 12th. In addition, a separate question asks test-takers to tally the total number of years of study they have had in general subject areas (i.e., total years of math). The variables for number of years of math and number of years of science are based on responses to the question about total years of study. The response options that test-takers have include: (1) ½ year, (2) 1 year, (3) 2 years, (4) 3 years, (5) 4 years, and (6) more than 4 years. The data we receive from the College Board is coded with the raw responses from each test-taker. We then group the responses into new variables as follows:

I. Math is grouped/recoded into "4 years or more" (total of 4 years and more than 4 years) and "less than 4 years" (total of all other responses)
II. Science is grouped/recoded into "3 years of more" (total of 3 years, 4 years, and more than 4 years) and "less than 3 years" (total of all other responses)

On average, for all of the years covered by our dataset, over 80% of test-takers respond to the questions concerning the total number of years of math, and total number of years of science that they took in high school. We then combine/recode these two variables (years of math and years of science) into a single variable that tallies the number of respondents who report taking both four years or more of math and three years of more of science. The response rate for this combined variable is slightly lower (79%), as some test-takers answer one question, but not the other.

Source 2: Massachusetts Department of Elementary and Secondary Education – Massachusetts Comprehensive Assessment System (MCAS) Scores

These data were based on aggregated scores for all MA public school students as reported by the Massachusetts Department of Elementary and Secondary Education via their School/District Profiles Directory, at http://profiles.doe.mass.edu/.

Source 3: Massachusetts Department of Elementary and Secondary Education – Massachusetts Tests for Educator Licensure (MTEL) Passing Rates

These data were based on the number of test-takers and passing rates for first-time test-takers as reported by the Massachusetts Department of Elementary and Secondary Education at http://www.doe.mass.edu/mtel/results.html/.

Source 4: National Center for Education Statistics – Integrated Postsecondary Education Data System (IPEDS)

These data were based on aggregated tallies for all certificates/degrees granted by US institutions of higher education, including public, non-profit, and for-profit, as reported by the National Center for Education Statistics (NCES) at http://nces.ed.gov/ipeds/. While data are available for specific degrees, they have been grouped into three levels for presentation here: (1) Below Bachelor's = all certificates and degrees under the four-year degree level, including, for example, 12-month certificates or Associate's Degrees; (2) Bachelor's = all four-year degrees; and, (3) Above Bachelor's = all certificates and degrees above the four-year degree level, including, for example, Master's, PhD, or Certificate of Advanced Graduate Study.

Source 5: Massachusetts Department of Employment and Training – Massachusetts Job Vacancy Survey

These data were collected by the MA Department of Employment and Training (DETMA) through an annual survey conducted in the spring of each year. While DETMA did conduct a quarterly job vacancy survey prior to 2012, the results are not comparable to those collected through the 2012 and 2013 surveys. Because of this, data prior to 2012 are not reported here. DETMA's job vacancy survey data can be found at: http://lmi2.detma.org/Lmi/JVS_a.asp.

Source 6: Bureau of Labor Statistics – Occupational Employment Statistics

The Occupational Employment Statistics (OES) are annual estimates produced by the national Bureau of Labor Statistics. The estimates are available at the national, state, and other geographic areas. OES data can be found at: http://www.bls.gov/oes/.