

AP CHEMISTRY ANALYSIS

Prepared for the New Jersey Center for Teaching and Learning

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Introduction and Methodology

This report analyzes performance of New Jersey students on AP Chemistry assessments from 2009 to 2018, the most recent year for which data are available. AP Chemistry was redesigned in 2013 and is intended to be equivalent to a two-semester introductory college chemistry course. The course and exam are organized around underlying “Big Ideas” related to chemical elements and matter, including atoms, ions, molecules, and electrons; chemical reactions; and thermodynamics. Our analysis relies on the following three metrics:

- **Mean Score** – The College Board publishes mean scores by state for each year online at [“AP Program Participation and Performance Data 2018.”](#) We note that mean scores can often correlate negatively with participation rates; if only the highest-performing students take the test, scores will be higher. As such, we recommend interpreting mean scores with caution and considering participation rates at the same time. We also include other metrics to standardize performance across states.
- **Participation Score** – We calculate the percentage of students taking AP Chemistry by dividing the number of test-takers by the number of individuals in each state aged 15-19, as reported by the U.S. Census Bureau, times one thousand. Note that this is an approximation of the participation rate, not an exact statistic, since students may take the test at any point in high school. Rather, this approach is intended to create a standardized measure of general participation across states.
- **Total Score** – A standardized measure equal to the state mean score times the number of test-takers divided by the 15-19 year-old population. We recommend using the total score as a more accurate measure for comparing performance across states.

¹ “AP Chemistry.” AP Higher Education. <https://aphighered.collegeboard.org/courses-exams/stem/chemistry>

Key Findings

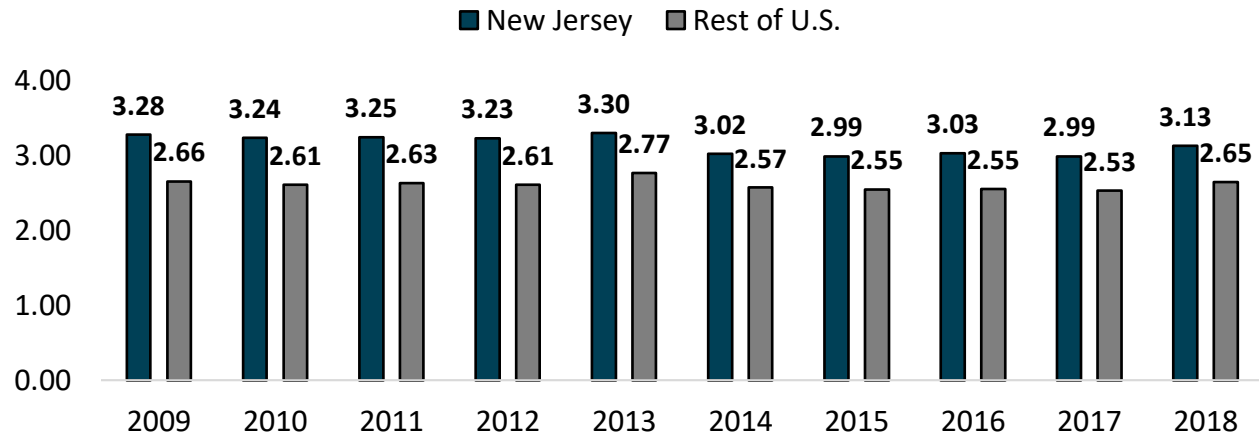
- **Since 2009, New Jersey's total score on the AP Chemistry exam has been around double that of the average total score in the rest of the country.** The state consistently ranks among the top three states in terms of total score, and in 2018, New Jersey had the second highest total score in the country.
 - These high total scores are reflective of broad participation in AP Chemistry exams (the state ranked has ranked second in participation since 2016) and high performance from test-takers (with mean scores 0.44 to 0.62 points higher than the mean score in the rest of the country).
- **Although New Jersey has outpaced other states in terms of participation and overall performance, the state's mean scores in recent years have experienced a small decline compared to past years.** New Jersey's mean Chemistry score decreased slightly from a score of 3.3 in 2013 to a score of just around 3 between 2014 and 2017.
 - This slight decrease may be related to the redesign of the AP Chemistry course and exam in 2013 (schools and districts may have needed time to adjust to new requirements) as well as a noticeable jump in participation between 2013 and 2014 (an increase in test-taking could mean an increase in lower-performing students taking the exam).

ANALYSIS - AP CHEMISTRY EXAM

Mean Score and Participation

New Jersey has consistently outpaced the rest of the nation with mean scores ranging from 2.99 to 3.28, or 0.44 to 0.62 points higher than the average among other states in any given year. However, the state's mean scores have declined slightly in recent years, decreasing from an average of 3.3 in 2013 to an average of just around 3 between 2014 and 2017.

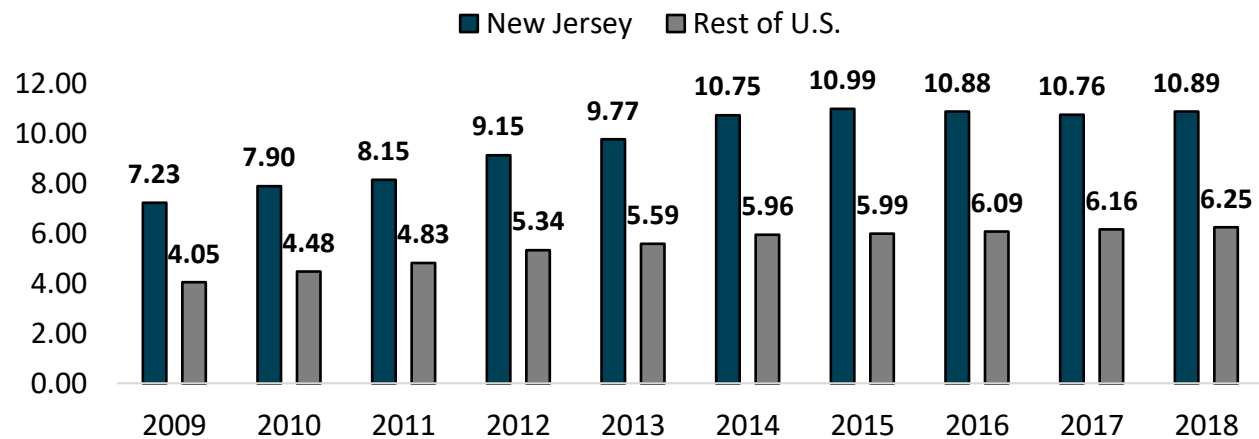
Mean Score in New Jersey and the Rest of the United States, 2009-2018



Mean scores for the rest of the country are imputed from national and New Jersey averages.

Overall, participation scores have increased statewide and nationally from 2009 to 2018. New Jersey saw the biggest increase (nearly a 1-point jump) from 2013 to 2014. The state's participation scores have been more than 40 percent higher than the rest of the country in every year examined.

Participation Score in New Jersey and the Rest of the United States, 2009-2018

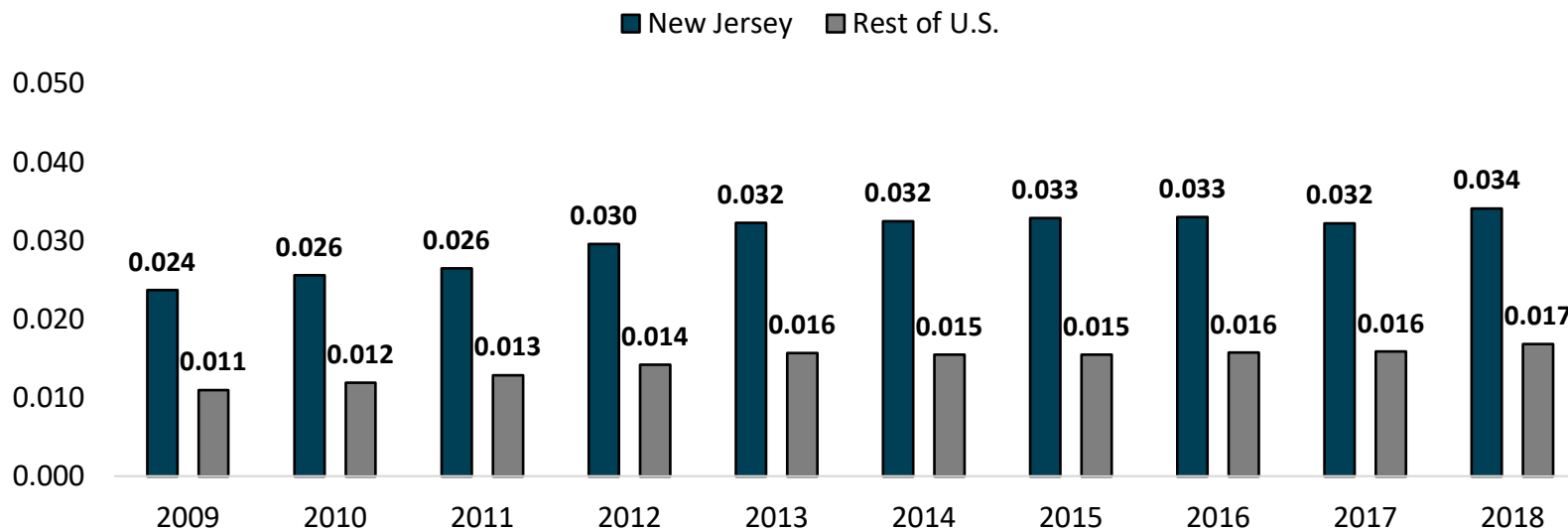


Participation score is equal to the number of test-takers divided by the number of 15-19 year-olds in the state, times one thousand.

Total Score

Since 2009, New Jersey's total score on the AP Chemistry exam has been around double that of the average total score in the rest of the country. The state's total score increased from 0.024 in 2009 to 0.034 in 2018, with total scores consistently around the 0.03 level in every year since 2012.

Total Score on All AP Chemistry Exams in New Jersey and the Rest of the United States, 2009-2018



Total score is equal to the number of test-takers times the mean score for the state, divided by the number of 15-19 year-olds in the state.

Ranking Among U.S. States

New Jersey consistently ranks among the top four states in terms of mean score, participation, and total score. In 2018, the state ranked second, just slightly behind Massachusetts, in terms of both participation and total score. New Jersey also had the sixth highest growth score from 2009 to 2018 (defined as the change in total score over the period).

National Ranking of New Jersey's AP Chemistry Performance, 2009-2018

New Jersey's National Rank	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Mean Score	2	2	1	2	4	4	4	3	3	3
Participation Score	2	3	3	3	4	2	1	2	2	2
Total Score	1	2	2	2	3	3	1	2	3	2

Mean Score

Rank	State	Score
1	Connecticut	3.19
2	Massachusetts	3.14
3	New Jersey	3.13
4	Washington, DC	3.10
5	New Hampshire	3.07

Participation Score

Rank	State	Score
1	Massachusetts	11.29
2	New Jersey	10.89
3	Connecticut	10.68
4	Washington, DC	10.15
5	Alabama	9.63

Participation score is equal to the number of test-takers divided by the number of 15-19 year-olds in the state, times one thousand.

Total Score

Rank	State	Score
1	Massachusetts	0.035
2	New Jersey	0.034
3	Connecticut	0.034
4	Washington, DC	0.031
5	Maryland	0.026

Total score is equal to the number of test-takers times the mean score for the state, divided by the number of 15-19 year-olds in the state.

Growth Score (2009-2018)

Rank	State	Score
1	Connecticut	0.011
2	Massachusetts	0.011
3	Alabama	0.010
4	Indiana	0.010
5	Delaware	0.009
6	New Jersey	0.009

Growth score is the difference between the 2009 and 2018 total scores by state.



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