

PVAAS

POLICY BRIEF

What Educators Should Know About PVAAS Student Probabilities

The PVAAS probabilities for reaching future academic milestones are based on prior achievement data for each student. For teachers, the projections for the current year offer a basis for differentiated instruction, for identifying students needing an academic intervention, or for determining a student's readiness for advanced coursework. A student with a very low probability is unlikely to reach proficiency without additional supports. Students with a higher probability will likely meet or exceed the proficiency cut on the upcoming assessment if the educational characteristics that created the success continue for that student.

What prior achievement data is used in the PVAAS projections?

PVAAS uses the historical state assessment data from the most recent five years, when available, to project future PSSA performances in Math, English Language Arts, Science, and future Keystone performances in Algebra I, Biology, and Literature. Projections to future college readiness exams are also available for PSAT, AP, ACT, and SAT. The table below illustrates the assessment scores used for projections to the state and national assessments.

Projection to...	Data Used to Calculate Projection
PSSA Math	PSSA Math English Language Arts and Science (in grades available)
PSSA English Language Arts	PSSA Math English Language Arts and Science (in grades available)
PSSA Science	PSSA Math, English Language Arts, and Science (in grades available)
Keystone Algebra I	PSSA Math, English Language Arts, and Science (in grades available)
Keystone Biology	PSSA Math, English Language Arts, and Science; Keystone Algebra I
Keystone Literature	PSSA Math, English Language Arts, and Science; Keystone Algebra I and Biology
PSAT, SAT, ACT, AP	PSSA Math, English Language Arts, and Science; Keystone Algebra I, Biology, and Literature

This approach yields reliable results because high correlations (meaning, a predictable relationship) exist between the PSSA, Keystone, and college readiness scores across grade levels in a single subject area and across subjects. Using so many test records in the PVAAS analysis (approximately 115,000 per grade level per subject area) further improves the predictive power of the data. To illustrate these high correlations using the 2018-19 data, the average multiple correlation obtained when predicting PSSA Math using all prior test scores ranges from 0.82 to 0.86, in PSSA English Language Arts from 0.80 to 0.84, and in PSSA Science from 0.77 to 0.78. The predicted scores of Keystone content areas using prior PSSA scores has a multiple correlation ranging from 0.77 to 0.80. In less technical terms, this means that the data used to calculate the projection has a very strong positive relationship to the actual projections.

How good are the PVAAS projection probabilities?

To answer the question, students' test scores from the prior school year were compared to their PVAAS probabilities for achieving proficiency or a college readiness benchmark at the beginning of the school year. Students were divided into two groups based on their probabilities at the end of the previous school year. Comparisons were made for students with probabilities less than 70% and for students with probabilities equal to or greater than 70%. The tables below provide the results for the statewide assessments (PSSA and Keystone) as well as college readiness assessments (ACT and AP) from a typical year of reporting in 2018-19 school year. The results are reported in the tables below and establish the validity of the individual PVAAS probabilities as an important indicator in developing individualized student academic plans.

Table 1: How often did students with PVAAS probabilities of 70% or greater score at Proficient or Advanced?

Grade	PSSA Math	PSSA English Language Arts	PSSA Science
3 to 4	92.4%	95.3%	93.3%
4 to 5	89.6%	92.2%	N/A
5 to 6	89.8%	93.4%	N/A
6 to 7	92.0%	91.8%	N/A
7 to 8	92.1%	92.7%	93.9%
	Algebra I	Literature	Biology
Last Grade Tested	81.9%	94.3%	89.7%

Table 2: How often did students with PVAAS probabilities less than 70% score at Proficient or Advanced?

Grade	PSSA Math	PSSA English Language Arts	PSSA Science
3 to 4	23.7%	33.0%	36.8%
4 to 5	16.2%	22.9%	N/A
5 to 6	15.1%	24.7%	N/A
6 to 7	14.2%	25.2%	N/A
7 to 8	14.6%	21.3%	28.4%
	Algebra I	Literature	Biology
Last Grade Tested	13.3%	25.0%	17.6%

Table 3: How often did students with PVAAS probabilities of 70% or greater score at college readiness benchmarks?

Benchmark	Percentage
ACT English 18	93.9%
ACT Mathematics 22	95.1%
ACT Reading 22	90.8%
ACT Science 23	92.2%
AP Biology 3 or higher	90.9%
AP Calculus AB 3 or higher	82.7%
AP English Language & Comp. 3 or higher	88.6%
AP English Literature & Comp. 3 or higher	81.7%
AP Psychology 3 or higher	89.7%
AP Statistics 3 or higher	90.9%
AP US Government and Politics 3 or higher	88.3%
AP US History 3 or higher	86.1%
PSAT 8/9 Evidence-Based Reading and Writing 410	93.0%
PSAT 8/9 Mathematics 450	98.0%
PSAT NMSQT Evidence-Based Reading and Writing 460	92.1%
PSAT NMSQT Mathematics 510	91.8%
SAT Evidence-Based Reading and Writing 480	94.9%
SAT Mathematics 530	93.4%

Table 4: How often did students with PVAAS probabilities less than 70% score at college readiness benchmarks?

Benchmark	Percentage
ACT English 18	31.6%
ACT Mathematics 22	29.4%
ACT Reading 22	32.6%
ACT Science 23	33.6%
AP Biology 3 or higher	34.7%
AP Calculus AB 3 or higher	44.8%
AP English Language & Comp. 3 or higher	36.6%
AP English Literature & Comp. 3 or higher	28.1%
AP Psychology 3 or higher	44.8%
AP Statistics 3 or higher	44.5%
AP US Government and Politics 3 or higher	44.2%
AP US History 3 or higher	39.4%
PSAT 8/9 Evidence-Based Reading and Writing 410	19.8%
PSAT 8/9 Mathematics 450	21.9%
PSAT NMSQT Evidence-Based Reading and Writing 460	20.4%
PSAT NMSQT Mathematics 510	17.9%
SAT Evidence-Based Reading and Writing 480	35.0%
SAT Mathematics 530	28.4%

How accurate are the PVAAS projections?

A student's score from the end of a grade and subject reflects the student's achievement *as well as the educational influence of the LEA/district, school, and teaching that they experienced*. PVAAS probabilities do not account for the effectiveness of the classroom-specific curriculum, assessment, and instruction in the current year. Instead, they reflect what the student is likely to score assuming the typical schooling experience.

- A highly effective standards-aligned system at the school where a student attends can increase the likelihood that the student will reach the proficiency cut. Highly effective schools have value-added results shaded dark blue.
- When students do not experience an effective standards-aligned system at their school, the students are less likely to score as predicted. Students with 40-70% probabilities might not reach proficiency in these learning environments. Less effective schools have value-added results shaded red.

The projections to student performance in the 2021-22 school year use data about the relationship between test scores from the last cohort of students tested before the pandemic in order to provide projections based on a more typical year-to-year change in student achievement. The projections, along with local knowledge and resources, can assist educators with planning for students' success on future assessments.

What are the implications for policy decisions?

Although educators may choose slightly different probability ranges from those above, the cuts of less than 70% and greater than 70% are particularly appropriate for making decisions about students. **This conclusion is based on the percentage of students reaching proficiency and the percentage of students not reaching the proficiency mark in the two ranges above.** However, students in very effective schools with probabilities near 70% might also be successful. Therefore, the PVAAS Custom Student Report functionality enables educators to vary the ranges of probabilities used to identify students.