

# Updates to AP Potential™ Expectancy Tables

Jeff Wyatt, Katie Fletcher, and Maureen Ewing

December 2023

## Introduction

AP Potential™ is a data-driven tool that uses SAT Suite of Assessment scores to identify students who are likely to do well on one or more AP Exams. Support for using scores for this purpose is grounded in research that shows that SAT Suite of Assessment scores are strong predictors of AP Exam performance, even stronger than self-reported high school grade point average (HSGPA), grades in related subjects, and total years of study in related subjects (Camara & Millsap, 1998; Ewing, Camara, & Millsap, 2006; Zhang, Patel, & Ewing, 2014a).

As an educational guidance tool, AP Potential is meant to encourage students to participate in the AP Program. Participating in AP can have a positive impact on students' readiness for college and lead to opportunities to earn college credit while in high school. Research finds that students who receive a personalized message about their AP Potential on a College Board score report are substantially more likely to enroll in an AP course and pass the AP Exam than students who do not receive the personalized message (Gonzalez, 2017). At the same time, however, AP Potential results should never be used to deny students access to an AP course. Instead, the information represents one piece of information meant to encourage participation among students who may not have considered themselves ready for AP.

## Updating AP Potential

AP Potential has been used to identify prospective AP students for more than 20 years. This report provides current AP Potential Expectancy Tables and details for each subject the data that are used in the calculations. For most subjects, AP Potential predictions are derived by using 10<sup>th</sup> and 11<sup>th</sup> grade SAT Suite of Assessment scores in one year to predict performance on AP Exams administered the following year in 11<sup>th</sup> or 12<sup>th</sup> grade. For AP courses that are commonly taken earlier in high school including Art History, Computer Science Principles, European History, Human Geography, Seminar, and World History, we also include in the calculations scores from the 9<sup>th</sup> grade SAT Suite of Assessments and 10<sup>th</sup> grade AP Exam scores along with data score data from later grades.

## Correlations between SAT Suite of Assessment Scores and AP Exams

SAT Suite of Assessment scores are strong predictors of AP Exam success. Table 1 shows the correlations between AP Exam scores and the SAT Suite of Assessment Evidence-based Reading and Writing section score (ERW), Math section score, and Total score. Correlation values range from -1.00 (indicating a perfect negative relationship) to +1.00 (indicating a perfect positive relationship) with values close to zero indicating no relationship between variables.

As Table 1 shows, the correlation values for the 23 AP Exams for which AP Potential is reported are all in the moderate to high range. Specific values range from 0.48 for Physics C: E&M to 0.75 for Biology, with most correlations above 0.60. The bolded number in each row indicates the SAT Suite of Assessments score that had the strongest correlation with the corresponding AP Exam score. In most cases, the Total score, which is the sum of ERW + Math section scores, was the strongest predictor of AP Exam performance and was most frequently chosen as the basis for computing the expectancy table, as

indicated in the “predictor” column<sup>1</sup>. The exceptions are Calculus AB which correlated highest with Math section scores and English Language, English Literature, and Art History which correlated highest with ERW scores<sup>2</sup>.

### AP Potential Expectancy Tables

To develop the AP Potential Expectancy Tables, logistic regression models are fitted for each AP Exam by including the most appropriate score from the SAT Suite of Assessments (i.e., Total score, Math section score, or ERW section score) to predict the probability of achieving an AP score of 3 or better. The SAT Suite of Assessment scores associated with specific probabilities of success are calculated for each AP Exam based on the parameter estimates from the logistic regression model. The AP Potential Expectancy Tables show scores associated with achieving a 3 or higher on AP Exams at various probability levels ranging from 10% to 90% in 10% increments (See Table 2).

### Using AP Potential Expectancy Tables

To use the expectancy tables to identify students for enrollment in specific AP courses, educators would first locate the cut score associated with a level of probability (or threshold) they are comfortable with for achieving an AP score of 3 or better. For example, if a school chooses the 60% threshold for success on the AP Biology Exam, a minimum SAT/PSAT Total score of 1060 would be used to identify students. Users should keep in mind that the logistic regression models on which the expectancy tables are built involve measurement error. Classification rates are imperfect, meaning that SAT Suite of Assessment scores do not account for all the variability in AP Exam performance, and some uncertainty about the probability of succeeding on AP Exams remains. The actual chance of any individual student succeeding might be lower or higher given many other factors.

### Conclusion

AP Potential can be helpful in identifying additional students for AP courses, especially those students who may not have previously considered AP. This report provides current AP Potential Expectancy Tables as of December 2022. Updates to the expectancy tables may be made periodically on a subject-by-subject basis. The most up-to-date expectancy tables can be found on the College Board’s website.<sup>3</sup>

---

<sup>1</sup> The relationship between Physics C: Electricity and Magnetism with Math section scores and Total scores as well as the relationship between Physics C: Mechanics with Math section scores and Total scores were essentially identical; therefore, the Total score was chosen as the basis for computing the expectancy tables to be consistent with other AP science subjects.

<sup>2</sup> As in the past, AP Potential is not reported for the AP World Language and AP Studio Art Exams because the correlations do not meet the threshold ( $r=0.40$  or higher) required for reporting.

<sup>3</sup> <http://www.collegeboard.com/counselors/app/expectancy.html>

## References

Camara, W. J., & Millsap, R. E. (1998). Using the PSAT/NMSQT and course grades in predicting success in the Advanced Placement Program (College Board Research Report No. 98-4). New York: The College Board.

Ewing, M., Camara, W. J., & Millsap, R. E. (2006). The Relationship between PSAT/NMSQT scores and AP Exam grades: A follow-up study (College Board Research Report No. 2006-1). New York: The College Board.

Gonzalez, N. (2017) Small Changes Make a Big Difference: How Behavioral Science Improved Participation in Advanced Placement. Oakland, CA: Mathematica Policy Research.

Zhang, X., Patel, P., Ewing, M. (2014a). AP® Potential predicted by PSAT/NMSQT® scores using logistic regression (College Board Statistical Report 2014-1). New York: The College Board.

Zhang, X., Patel, P., Ewing, M. (2014b). Incorporating 9th- grade PSAT/NMSQT® scores into AP Potential™ predictions for AP® European History and AP World History (College Board Statistical Report 2014-2). New York: The College Board.

**Table 1: Correlations between the SAT Suite of Assessment Scores and AP Exam Scores**

Subject	Grade-Level (PSAT/SAT)	Total	ERW	Math	Selected Predictor
Art History	9/10/11	0.497	<b>0.521</b>	0.405	ERW
Biology	10/11	<b>0.752</b>	0.71	0.69	Total
Calculus AB	10/11	0.54	0.418	<b>0.558</b>	Math
Chemistry	10/11	<b>0.655</b>	0.549	0.649	Total
Comparative Gov't and Politics	10/11	<b>0.589</b>	0.588	0.503	Total
Computer Science A	10/11	<b>0.603</b>	0.521	0.584	Total
Computer Science Principles	9/10/11	<b>0.654</b>	0.602	0.615	Total
English Language	10/11	0.725	<b>0.739</b>	0.613	ERW
English Literature	10/11	0.7	<b>0.728</b>	0.584	ERW
Environmental Science	10/11	<b>0.706</b>	0.675	0.634	Total
European History	9/10/11	<b>0.63</b>	0.626	0.545	Total
Human Geography	9/10/11	<b>0.623</b>	0.62	0.535	Total
Macroeconomics	10/11	<b>0.624</b>	0.54	0.609	Total
Microeconomics	10/11	<b>0.632</b>	0.537	0.618	Total
Music	10/11	<b>0.542</b>	0.482	0.527	Total
Physics 1	10/11	<b>0.647</b>	0.545	0.645	Total
Physics C: E&M	10/11	0.474	0.363	<b>0.478</b>	Total
Physics C: Mechanics	10/11	0.586	0.455	<b>0.592</b>	Total
Psychology	10/11	<b>0.636</b>	0.632	0.553	Total
Seminar	9/10/11	<b>0.54</b>	0.528	0.471	Total
Statistics	10/11	<b>0.697</b>	0.593	0.684	Total
U.S. Gov't and Politics	10/11	<b>0.647</b>	0.637	0.574	Total
U.S. History	10/11	<b>0.675</b>	0.667	0.585	Total
World History	9/10/11	<b>0.676</b>	0.658	0.591	Total

Note: Correlations are calculated using data from the SAT Suite of Assessments administered in the 2016-17 and 2017-18 academic years and AP Exams administered in 2018 and 2019.

**Table 2: AP Potential Cut Scores Associated with Scores of 3 or Higher by AP Exam**

Subject	Grade-Level (PSAT/SAT)	Predictor	Sample Size	AP Potential Cut Score								
				10%	20%	30%	40%	50%	60%	70%	80%	90%
Art History	9/10/11	ERW	36,698	340	410	450	490	520	550	590	630	700
Biology	10/11	Total	110,966	870	930	970	1000	1030	1060	1090	1130	1190
Calculus AB	10/11	Math	480,485	440	490	520	550	570	600	620	660	700
Chemistry	10/11	Total	85,797	800	880	930	970	1010	1050	1090	1150	1220
Comparative Gov't & Politics	10/11	Total	13,325	830	920	970	1020	1060	1110	1150	1210	1300
Computer Science A	10/11	Total	85,611	860	960	1020	1080	1130	1180	1230	1300	1390
Computer Science Principles	9/10/11	Total	45,640	790	870	930	970	1010	1060	1100	1160	1240
English Language	10/11	ERW	200,195	430	470	490	510	530	550	560	590	620
English Literature	10/11	ERW	221,697	390	420	450	470	490	500	520	550	580
Environmental Science	10/11	Total	91,279	910	970	1020	1050	1080	1120	1150	1200	1260
European History	9/10/11	Total	97,535	820	900	960	1010	1050	1090	1140	1200	1290
Human Geography	9/10/11	Total	76,080	770	860	910	960	1000	1050	1090	1150	1230
Macroeconomics	10/11	Total	113,614	840	930	990	1040	1080	1130	1180	1240	1330
Microeconomics	10/11	Total	62,431	820	910	970	1020	1070	1120	1170	1230	1320
Music	10/11	Total	25,549	720	840	920	990	1050	1110	1170	1250	1370
Physics 1	10/11	Total	238,540	1010	1090	1140	1180	1220	1250	1300	1350	1420
Phys C: E&M	10/11	Total	42,468	950	1050	1120	1170	1220	1270	1330	1390	1500
Physics C: Mechanics	10/11	Total	95,021	920	1000	1060	1100	1140	1180	1230	1280	1360
Psychology	10/11	Total	426,236	790	870	920	970	1010	1050	1090	1150	1230
Seminar	9/10/11	Total	45,919	860	860	860	860	860	900	960	1020	1120
Statistics	10/11	Total	342,715	940	1010	1060	1100	1140	1170	1210	1260	1330
U.S. Gov't and Politics	10/11	Total	461,065	900	980	1030	1080	1120	1160	1210	1260	1340
U.S. History	10/11	Total	640,108	860	930	980	1020	1060	1100	1140	1190	1260
World History	9/10/11	Total	60,955	760	830	880	920	960	990	1030	1080	1150

Note: Cut scores for most AP Exams are calculated using data from the SAT Suite of Assessments administered in 2016-17 and 2017-2018 academic years and AP Exams administered in May of 2018 and 2019. Exceptions include AP Exams that had a standard setting since 2019. Analyses for Biology, Comparative Government and Politics, Computer Science Principles, English Language, English Literature, Environmental Science and World History use data from the SAT Suite of Assessments administered in the 2020-21 academic year and AP Exams administered in May of 2022. Analyses for Chemistry, Macroeconomics and Microeconomics use data from the SAT Suite of Assessments administered in the 2021-22 academic year and AP Exams administered in May of 2023.