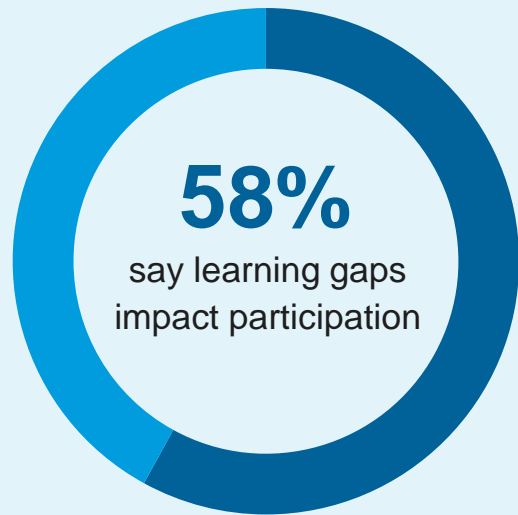

Project-Based AP Courses: Learn How AP Computer Science Principles and AP Seminar are Impacting Student Outcome

*College Success Forum
January 2022*

Teachers Say **Learning Gaps** Impact Participation in AP

Of the teachers expecting enrollment declines:



“The pandemic has affected the proficiency of students, and they're not confident that they can handle the AP curriculum or its workload.”

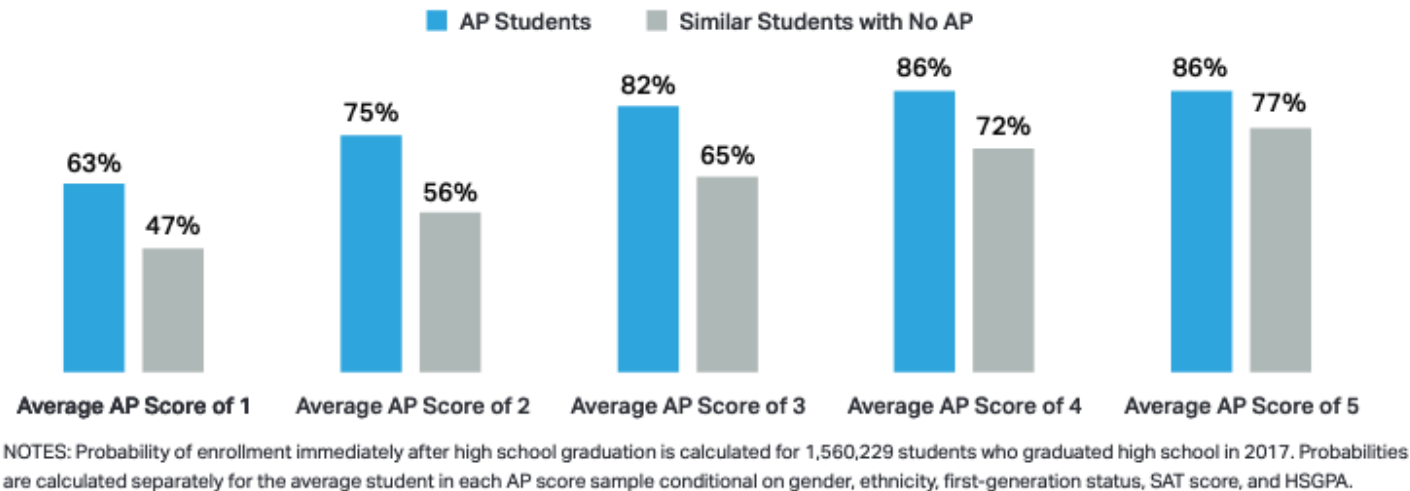
“Many students don't have confidence in their math ability because they had almost a full year online. I believe there will be a lot of gaps in knowledge.”

Source: AP Survey Findings, January 2021.

New Findings on the AP Experience

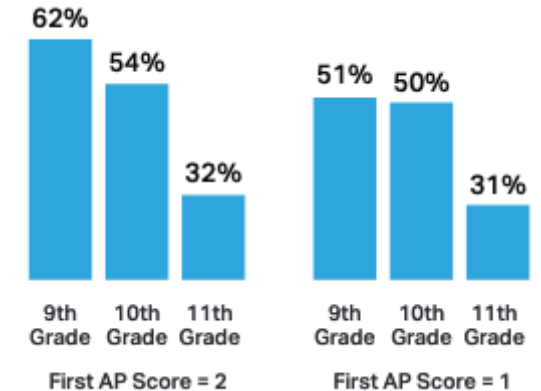
Regardless of the score, completing an AP Exam has benefits.

FOUR-YEAR COLLEGE ENROLLMENT PROBABILITIES, BY AVERAGE AP SCORE



Students who achieve 2s do significantly better in introductory college classes, compared to students with the same GPA and SAT® scores.

PERCENTAGE EARNING A HIGHER SCORE ON A SUBSEQUENT AP EXAM



Many students who first earn an AP Exam score of 1 or 2 will then earn a higher score on the subsequent AP Exams they take.

Why AP Seminar and AP Computer Science Principles?

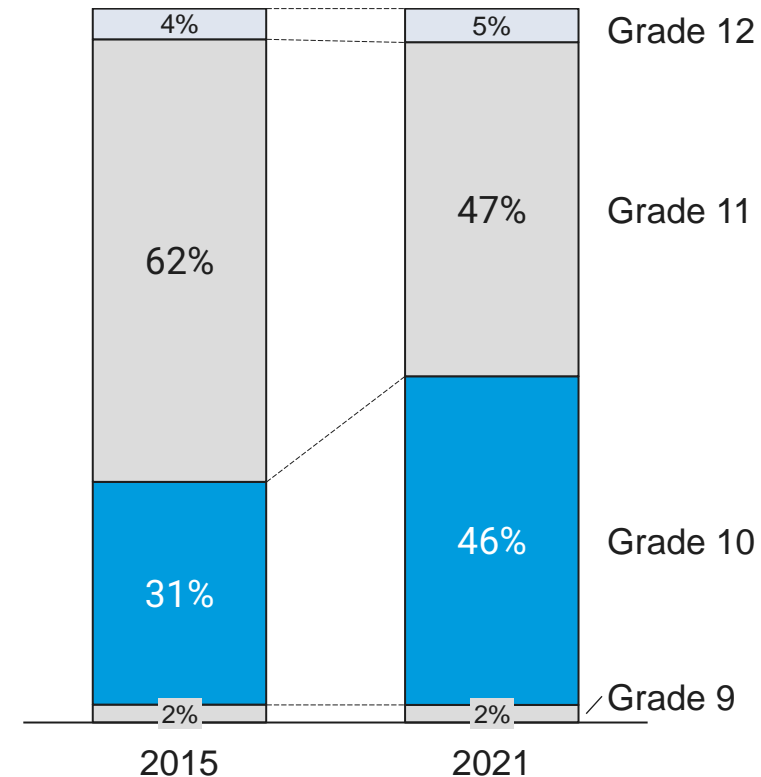
AP CSP is diversifying the STEM and computer science pipeline –especially among female, Black, Hispanic, and first-generation college students –

AP Seminar engages students in rigorous coursework and peer collaboration, preparing a diverse set of learners to attain key workforce skills, earn college credit, and succeed in college and the workplace - setting them on a path to declaring a STEM/CS major in college

Schools Shift AP Seminar to Grade 10

- Schools are recognizing that AP Seminar helps students not only to stand out for the AP Capstone awards but also to learn transferable skills measured on AP Exams taken in subsequent years.
- Today, the number of students taking AP Seminar in grade 10 is nearly identical to the number of students taking the course in grade 11.

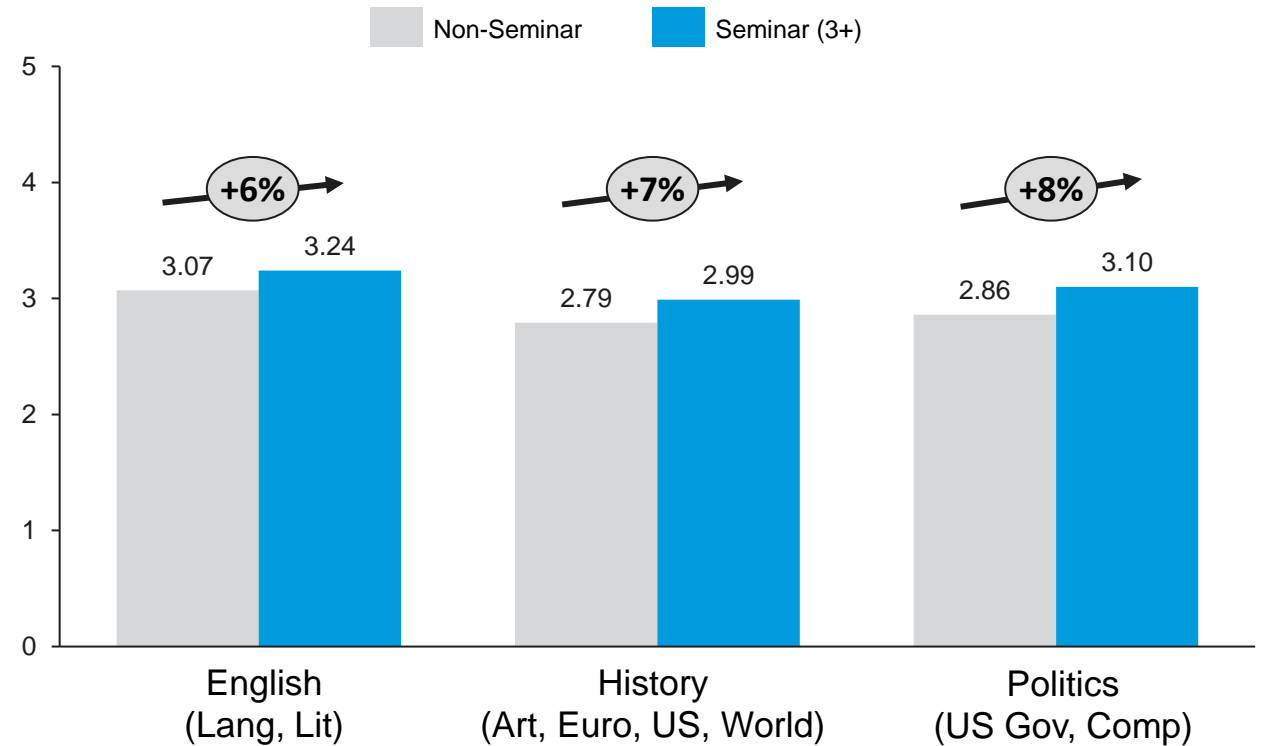
AP Seminar Exams, by Grade Level



High School Benefit: Increased Performance in AP

- The skills taught in AP Seminar enhance other AP experiences.
- AP Seminar students demonstrate stronger AP Exam performance on later AP Exams than their peers who didn't take AP Seminar.
- These results are consistent across race and ethnicity.

Average 2017 AP Scores NEXT-YEAR PERFORMANCE



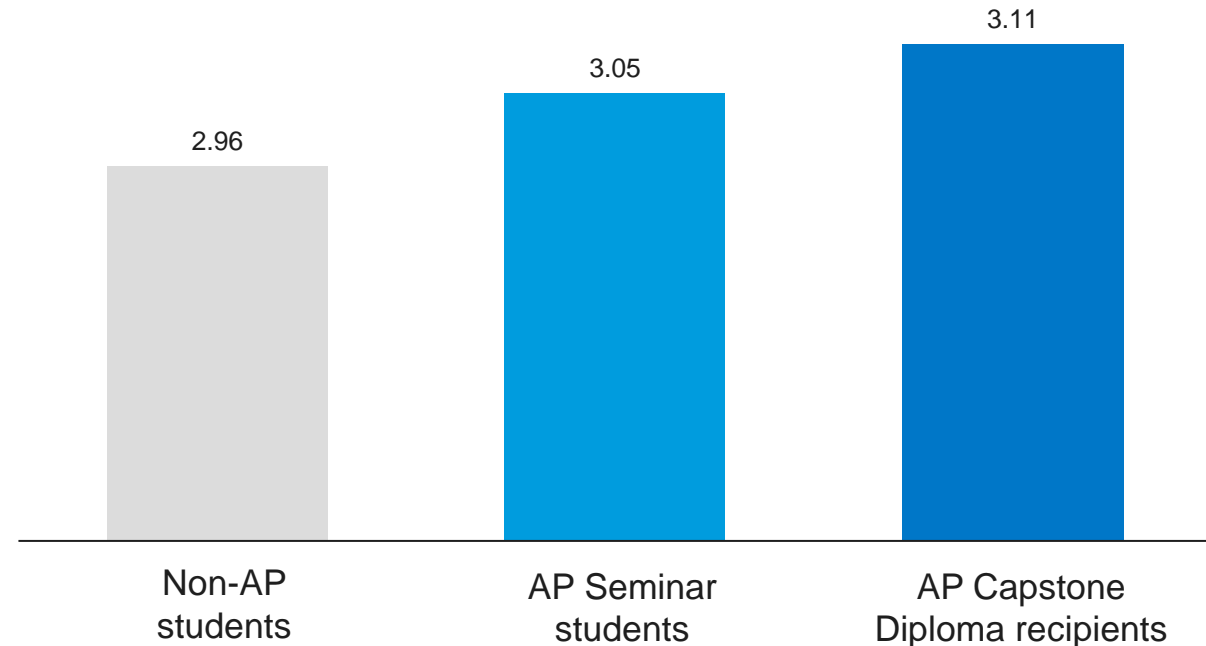
P value < 0.01 (all differences)

Notes: Results presented take into account student **first-generation** and **minority status**, **gender**, **high school grades**, **PSAT/NMSQT® scores**, **number of AP Exams** taken in the same subject area prior to AP Seminar, and number of other AP Exams taken prior to and concurrent with AP Seminar.

College Benefit No. 1: Higher First-Year GPAs

- AP Seminar students were shown to outperform non-AP students in first-year college GPA.
- AP Capstone courses emphasize academic skills, including:
 - Investigating academic and real-world topics
 - Interpreting and evaluating different perspectives
 - Gathering and analyzing data
 - Developing evidence-based arguments
 - Communicating publicly
- These results are consistent across race and ethnicity.

Average First-Year College GPA



P value < 0.01 (all differences)

Notes: Effects isolated by taking into account student **first-generation** and **minority status**, **gender**, **high school grades**, and **SAT scores**

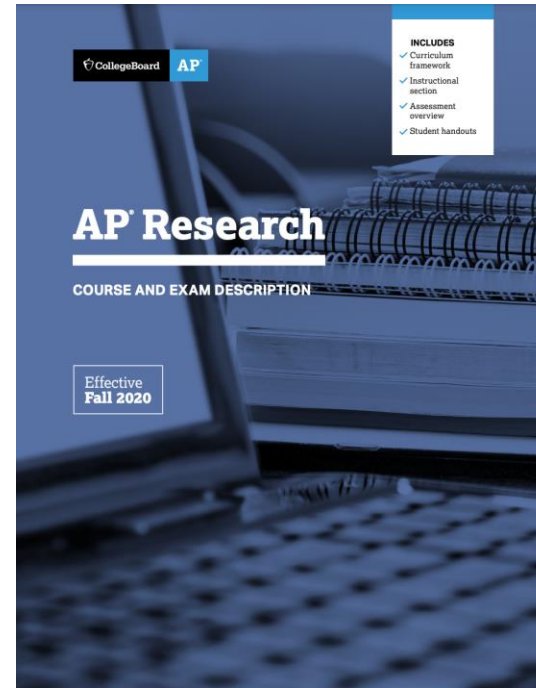
AP Seminar

The first course in the two-course AP Capstone Diploma™ Program



Year 1

EVALUATE
academic
conversations
through
secondary
research

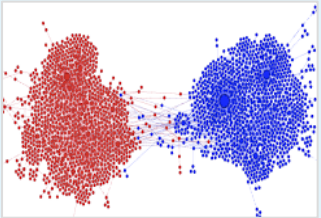


Year 2

CONTRIBUTE TO
academic
conversations
through
primary
research

Students Choose Topics That Interest Them

AP Seminar secondary research



Social Media and
Confirmation Bias



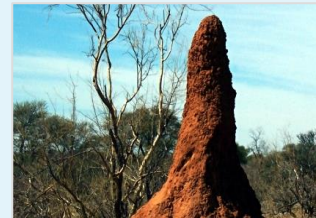
Automation and
Employment



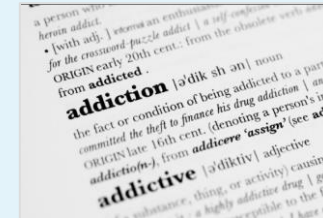
Gendered Toys



AP Research primary research



Designing
Buildings Based
on Macrotermite
Colonies



Exploring
Alternative
Addiction
Therapies



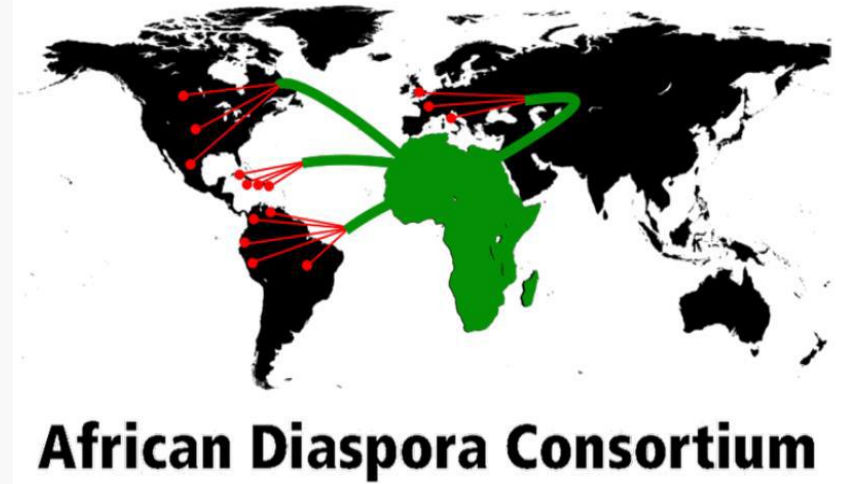
Developing an
Algorithm to
Predict
K-pop Success

- AP Seminar and AP Research students enjoy the freedom to choose the topics they want to research.
- Students deliver their arguments through written reports and multimedia presentations.
- Written samples and more for AP Seminar and AP Research can be found on AP Central.

AP Seminar: foundational, project-based learning course

- Explores real world topics
- Investigate a problem or issue
- Analyzes arguments
- Compares different perspectives

- **Teaching Resources available for the African American Diaspora theme for Seminar**



Welcome to Athena

Find, create, and collaborate on teaching materials.

Q Search all topics, teachers, and groups...

—> You can search by topic or hashtag (eg. Hamlet, Civil Rights Movement, #APSeminar, #online)

Looking for African Diaspora Consortium content? Search for #ADC.

Trending Topics

[African Diaspora](#)

175 items

[First day\(s\) of class](#)

124 items

[AP Capstone Seminar](#)

131 items

Why is Computer Science Important?

Consider these questions:

- How is technology influencing most career paths?
- What computer science skills will your students need when they enter the workforce?
- What concerns do you have, if any, about the availability of computer science courses in your area?



Development of AP CSP

- ❖ **AP Computer Science A, which focuses on JAVA**, has been a long-standing AP course that attracts students who know they want to pursue computer science.
- ❖ **AP CSP provides a broad introduction to computer science**, to reach more students and help them understand all aspects of computer science, including the creative aspects of programming.

Goals

- Make computer science more engaging and accessible.
- Reach students underrepresented in computer science.
- Better prepare students for the job market of today and tomorrow.

A Collaborative Process

- Partnership with the National Science Foundation since 2008.
- Educators from over 50 leading high schools and higher education institutions piloted the course.
- Over 950 colleges and universities have indicated that they will create policies to grant credit, placement, or both for the exam.

Research findings for AP CSP

AP Computer Science Principles and CS / STEM Diversification



Diversification

CSP is the first AP STEM Exam for many Black, Hispanic, and first-generation students.



STEM Persistence in HS

CSP students are more likely to take AP STEM and AP CS courses in high school.



Majors in College

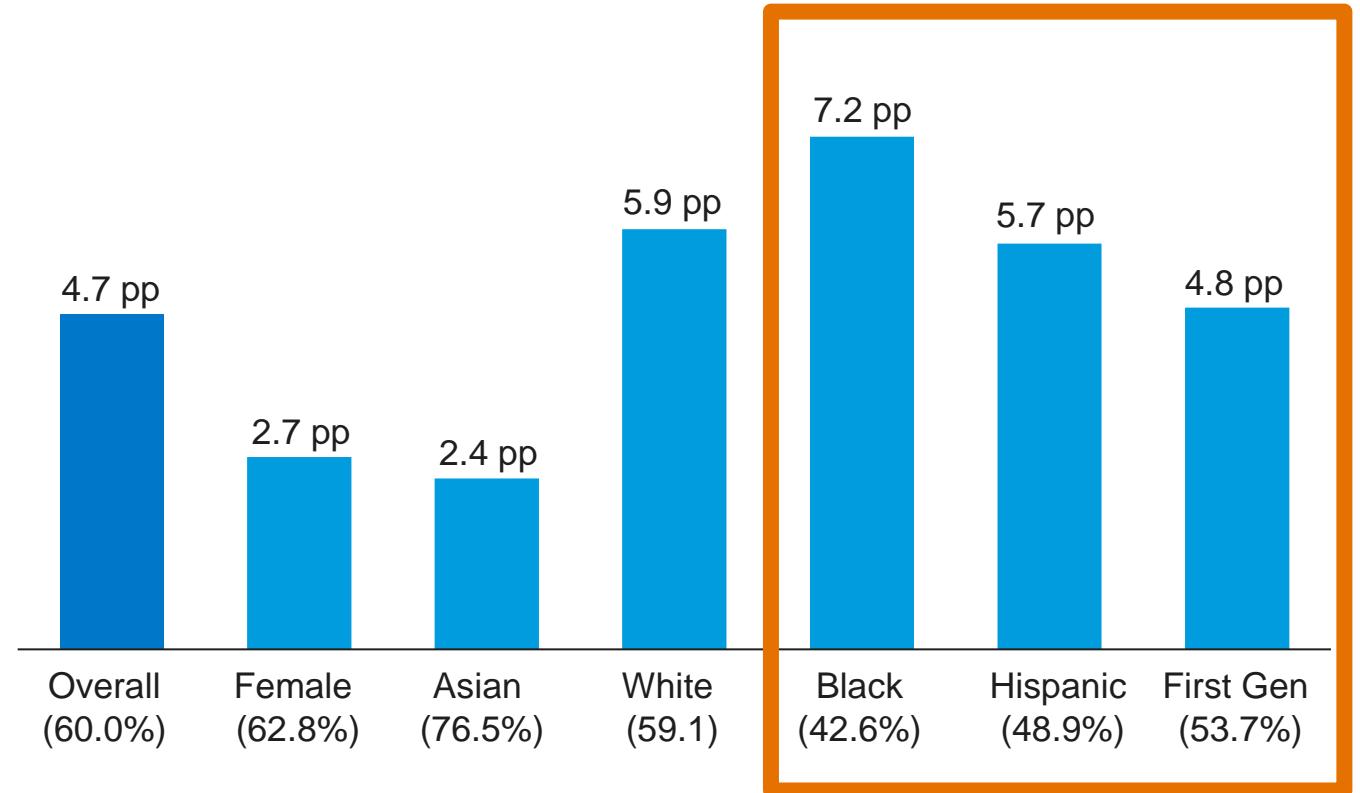
CSP students are more likely to major in STEM and CS in college.

<https://apcentral.collegeboard.org/pdf/ap-csp-and-stem-cs-pipelines.pdf?course=ap-computer-science-principles>

High School Benefit: AP CSP Students Persist in STEM

- AP CSP students are 4.7 percentage points more likely to take AP STEM exams in high school than similar non-AP CSP students.
- This is true across all student groups, particularly Black, Hispanic, and first-generation students.

Increase in Subsequent AP STEM Participation Associated with AP CSP Participation

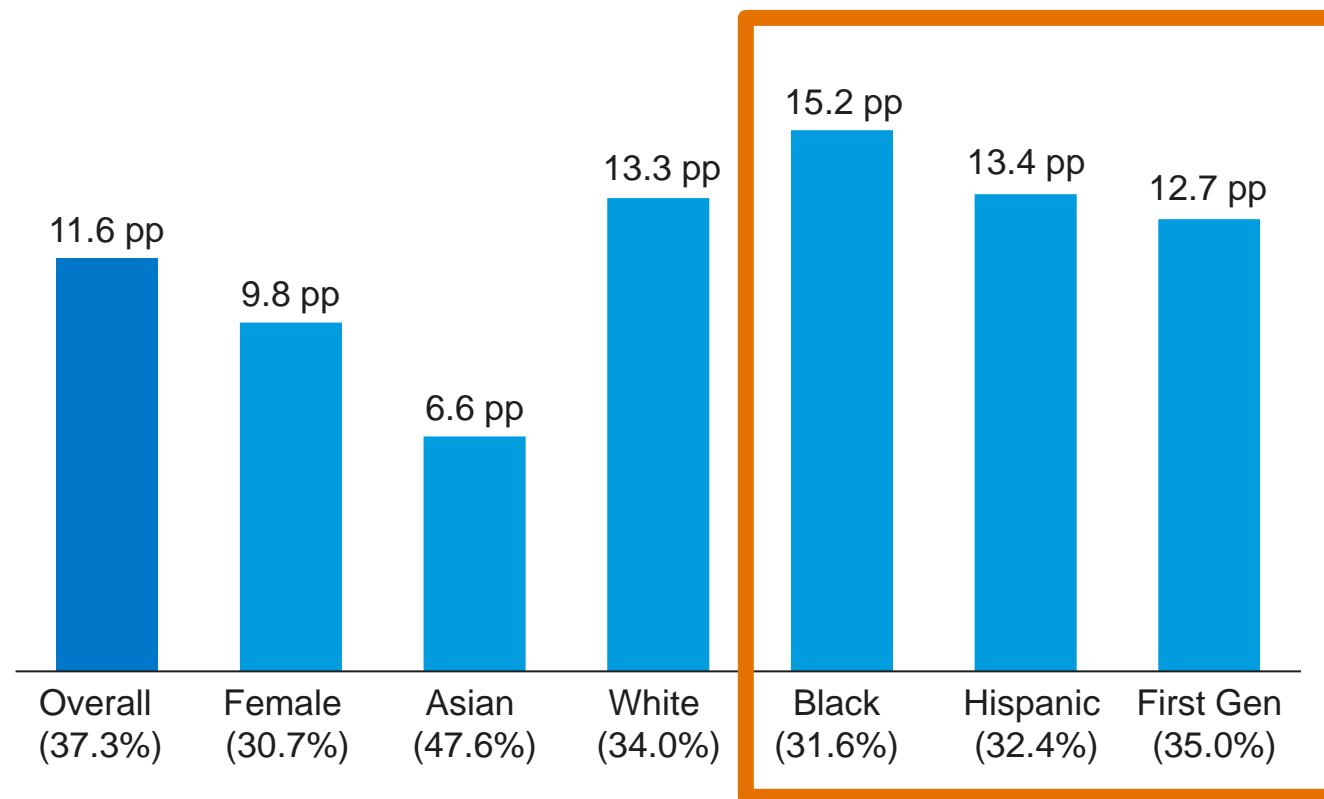


Note: Horizontal axis numbers in parentheses are the percentage of the non-AP CSP students in the subgroup who take AP STEM exams. For example, 60% of non-AP CSP students take AP STEM, while 64.7% of AP CSP students take AP STEM for a 4.7 percentage-point increase associated with AP CSP participation.

College Benefit No. 1: AP CSP Students Major in STEM

- AP CSP students are 11.6 percentage points more likely to declare a STEM major in college than otherwise similar non-AP CSP students.
- AP CSP students are more likely to major in a STEM field, particularly Black, Hispanic, and first-generation students.

Increase in STEM Major Declaration Associated with AP CSP Participation

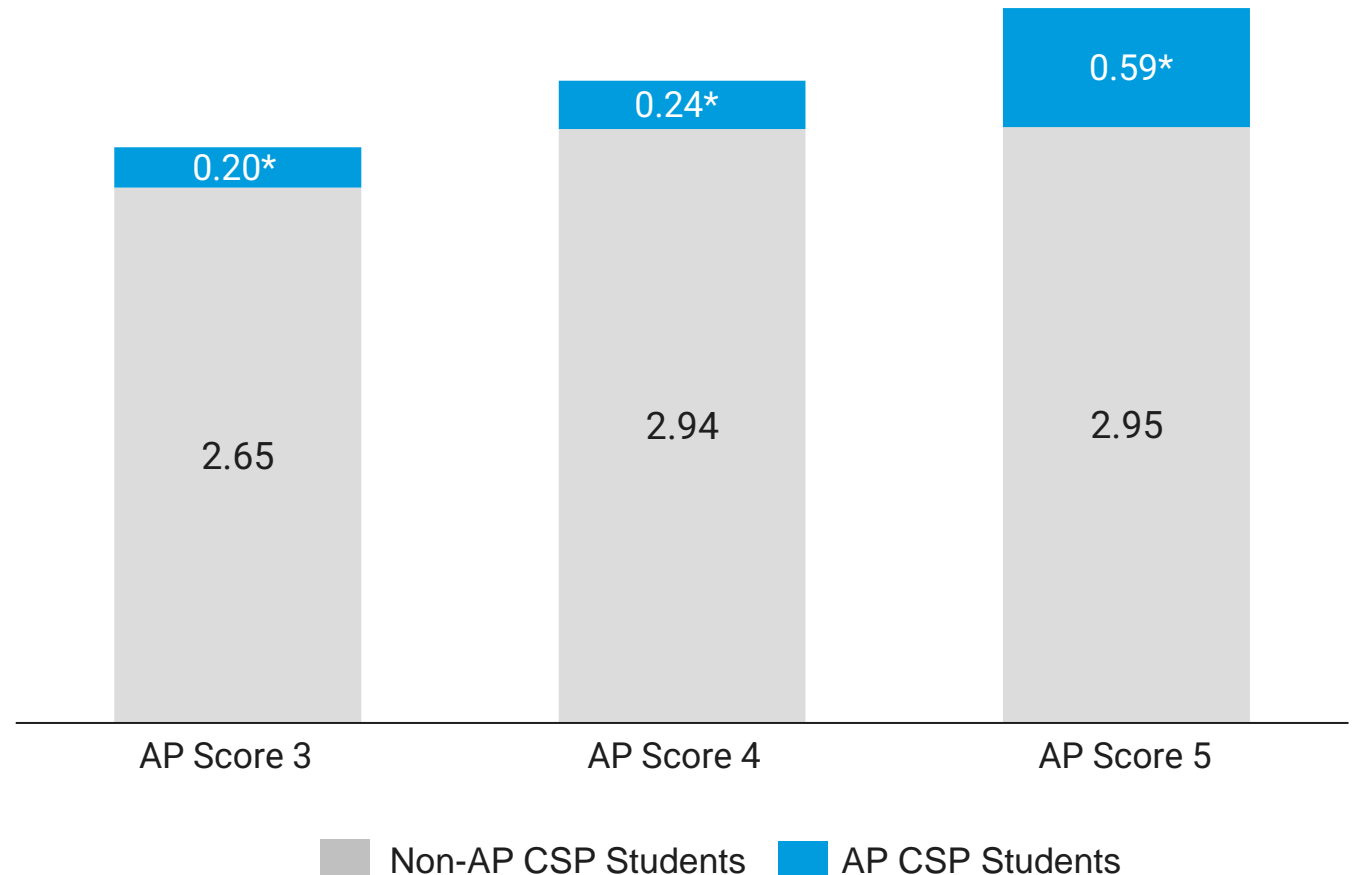


Note: Horizontal axis numbers in parentheses are the percentage of the non-AP CSP students in the subgroup who declare a STEM major. For example, 37.3% of non-AP CSP students declare a STEM major, while 48.9% of AP CSP students declare a STEM major for a 11.6 percentage-point increase associated with AP CSP participation.

College Benefit No. 2: **AP CSP Students Earn Higher GPAs**

- AP CSP students earn higher grades in sequent computer science courses than non-AP students who take the AP CSP-equivalent course in college.

Grade earned in sequent computer science course in college



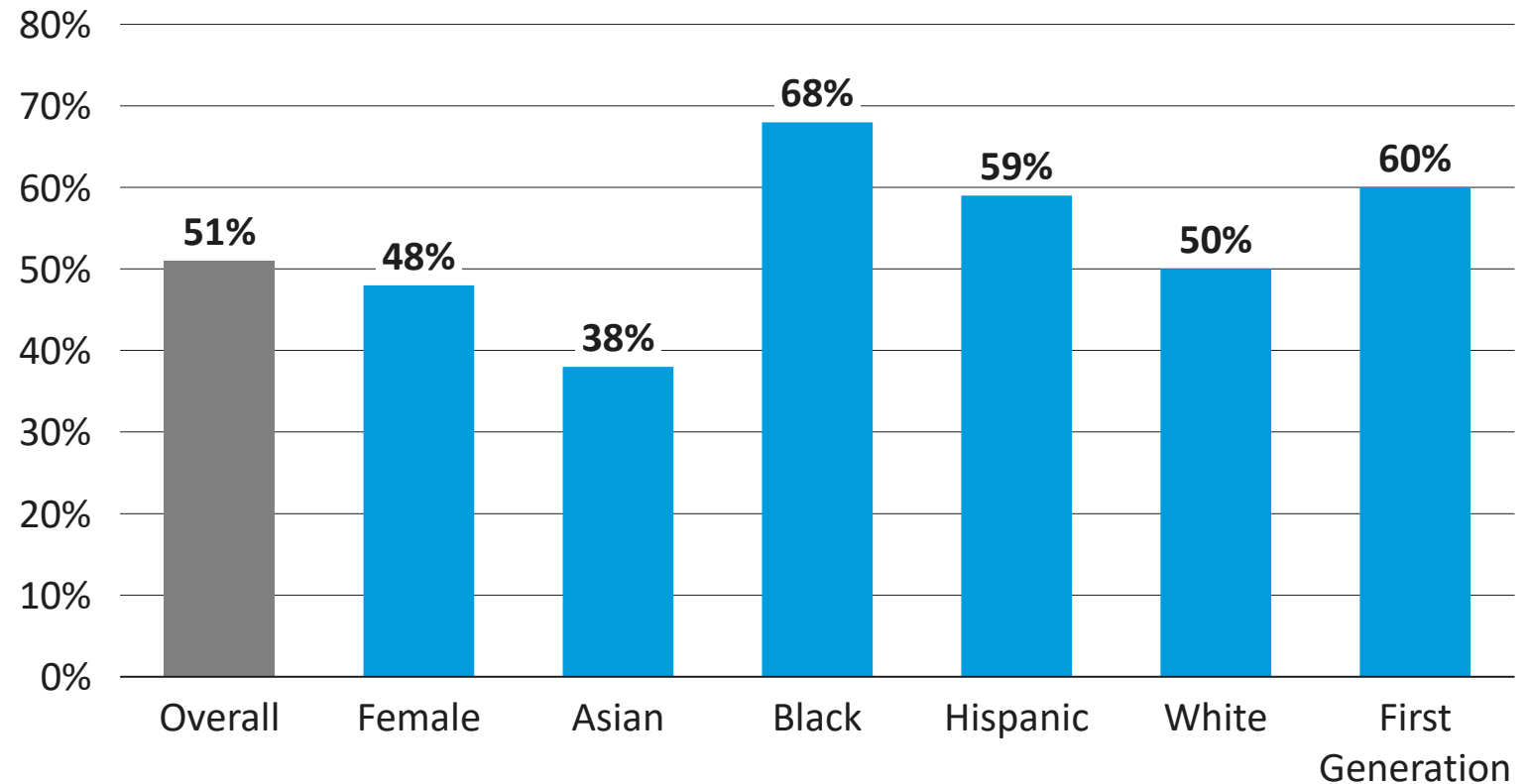
P value < 0.01

Source: 2017 and 2018 Cohort

CSP as an Introduction to AP STEM

CSP is the first AP STEM Exam for many Black, Hispanic, and first-generation students.

The Percentage of CSP Students for Whom AP CSP is their First AP STEM Course



Ever-Increasing Workforce Demand



Employment in computer and information technology occupations is **projected to grow 11% from 2019 to 2029**, much faster than the average for all occupations.



These occupations are projected to add about **531,200 new jobs**.



Demand for these workers will stem from greater emphasis on **cloud computing**, the collection and storage of **big data**, and **information security**.

Source: Bureau of Labor Statistics: Occupational Outlook Handbook <https://www.bls.gov/ooh/computer-and-information-technology/home.htm>

AP CSP: About the Course

AP Computer Science Principles offers a multidisciplinary approach, focusing on the creative aspects of programming.

Students will learn:

- Creative problem solving.
- How to apply computational processes to analyze large data sets.
- Programming.
- How the internet works and important cyber security issues.
- Impacts of computing innovations.

“It is an exploratory class that my students say is the best part of their day. They have shown creativity, ingenuity, and a collegiality collaboration I have not had in other courses I’ve taught.”

— Becky Byer, *AP Computer Science Principles Teacher from Wyoming*

Two AP Computer Science Courses

	AP Computer Science A	AP Computer Science Principles
Curricular Focus	Problem solving and object-orientated programming	Big ideas of computer science (including programming)
Programming Language	Java	Teachers choose
Assessment Experience	<ul style="list-style-type: none">• Multiple-choice and free-response questions	<ul style="list-style-type: none">• Multiple-choice exam• One performance task administered by the teacher, and students submit digital artifacts

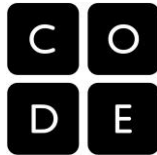
AP CSP Endorsed Providers in 2021-22 Academic Year

There are AP CSP endorsed providers, offering AP CSP resources and professional development across the country.

- Apple
- Beauty and Joy of Computing
- CodeHS
- Code.org
- CS Matters
- CS50
- Microsoft MakeCode
- Mobile CSP
- Popfizz CS
- Project Lead The Way
- Project STEM
- Tynker
- UTeach
- Zulama by Carnegie Learning



CodeHS



CS50



collegeboard.org/csp-endorsed-providers

Strengthen Student Readiness

Pre-AP[®]

Delivers the content and skills necessary for
success in AP for all students

Pre-AP Courses

Schools Can Choose Among 12 Courses

These high school-level courses may be offered at the grade level that's appropriate based on local requirements and practices, including middle school.



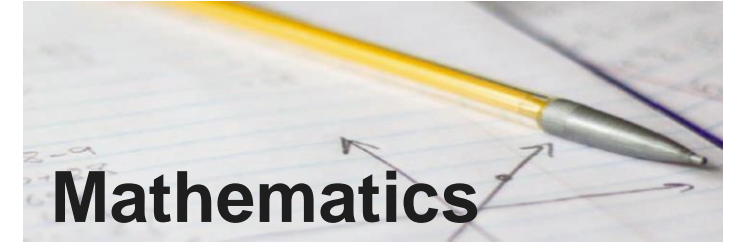
Pre-AP English 1
Pre-AP English 2



Pre-AP World History and Geography



Pre-AP Biology
Pre-AP Chemistry



Pre-AP Algebra 1
Pre-AP Geometry with Statistics
Pre-AP Algebra 2



Pre-AP Dance
Pre-AP Music

Pre-AP Theatre
Pre-AP Visual Arts



Questions?

AP[®]

CollegeBoard