WASHINGTON STATE

STEM EDUCATION INNOVATION ALLIANCE

2020 STEM Education Report Card

Kindergarten students at Bordeaux Elementary School in Shelton discuss their project "Trees, Forests, Weather and Seasons" with Governor Inslee – February 27, 2019

IMAGE COURTESY OF THE WASHINGTON STATE OFFICE OF THE GOVERNOR

Washington State STEM Education Innovation Alliance

WASHINGTON STUDENT ACHIEVEMENT COUNCIL
EDUCATION · OPPORTUNITY · RESULTS

For more information about the STEM Education Innovation Alliance, visit https://stem.wa.gov.

YEAR IN REVIEW

The STEM Alliance turned a spotlight on key STEM fields in 2019

The STEM Education Innovation Alliance held meetings across the state over the past year that highlighted five industries experiencing significant growth. The presentations emphasized the region's need for skilled workers in those fields. Washington is ranked among the best states in the country for business, with the nation's fastest growing economy,[1] #2 in the concentration of STEM workers,[2] #3 in STEM job growth,[3] and #2 in technology and innovation.[4] These discussions emphasized the importance of aligning STEM education and career-connected learning programs with workforce needs and job opportunities.

Student participants in the Washington MESA program

IMAGE COURTESY OF WASHINGTON MESA

HEALTHCARE & HEALTH SCIENCES

WA State University Health Sciences, Spokane
OCTOBER 10, 2018

Healthcare and health sciences are among the largest and fastest growing industries in Washington with a rising demand for services due to an aging population and more residents enrolled in health insurance. Shortages of healthcare professionals are particularly acute in rural areas.

The Spokane region is rapidly expanding as a center of excellence for health and medical sciences education along with biotechnology and life sciences hub in the Puget Sound region.

2014 marked the opening of the WSU Elson S. Floyd College of Medicine and the beginning of the UW School of Medicine and Gonzaga University Regional Health Partnership. They are both critical assets in providing opportunities for students to prepare for careers in the health industry and meeting urgent healthcare needs in eastern Washington and the rural areas of the state.

CLIMATE SCIENCE & EDUCATION

WA State Capitol, Columbia Room, Olympia
FEBRUARY 27, 2019

The STEM Alliance has urged the legislature to expand climate science education in our schools to provide every Washington teacher and student with applied climate science learning and build an understanding of climate change and its impact.

The Office of the Superintendent of Public Instruction and the UW Institute for Science + Math Education facilitate ClimeTime, a program that supports climate-focused teacher professional development, the design of instructional materials, related assessments and evaluation strategies, and facilitation of student events.

This meeting showcased climate science projects in K–12 presented by outstanding students from across the state. Presentations covered a wide range of topics, from food waste and carbon sinks to the effects of climate change and renewable resources.

Biology students practicing the procedure of replicating genetic material in the lab

IMAGE COURTESY OF CENTRAL WASHINGTON UNIVERSITY

BIOTECHNOLOGY & LIFE SCIENCES

AGC Biologics, Bothell
MAY 29, 2019

The biotechnology and life sciences industry represents a vibrant sector of Washington's economy, offering high-quality jobs in the design and manufacture of medical devices and biopharmaceuticals and in advancing innovations in a range of vital fields, such as ultrasound imaging, animal health, and cancer immunotherapies.

Expanding learning opportunities for students is one way to meet workforce needs and better prepare students for careers in this industry. AGC Biologics, a leader in clinical commercial manufacturing of therapeutic proteins, offers high school students a **5-month paid apprentice internship program** as part of their **Biotechnology Pathway** and trains interns in biotechnology process development, quality assurance, and manufacturing.

Analytical Chemists – Careers in Chemistry

IMAGE COURTESY OF CENTRAL WASHINGTON UNIVERSITY

AGRICULTURE & HYDROPOWER

Confluence Technology Center, Wenatchee
OCTOBER 2, 2019

Technical innovations are rapidly changing work environments in the **agriculture** industry, with jobs, even at the entry level, requiring more advanced technical skills. Employers in this industry are seeking workers educated in biology, genetics, engineering, physics, chemistry, math, geology, and hydrology.

STEM skills are needed to address a wide range of agricultural challenges, from sustaining orchard productivity as crops are stressed by climate change, to employing robotics in crop production, processing, distribution, and storage.

Hydropower is another key sector in the clean, renewable energy industry. Washington is the leading hydroelectricity-producing state in the nation, with growing workforce needs and job opportunities for technicians, engineering technologists, mechanical and electrical engineers, and other STEM-trained workers.

WASHINGTON'S STEM CHALLENGE

We are making progress but there are more hurdles to clear

★ A Focus on Building a Strong Education Continuum at All Stages, from Pre-school through College, is Critical to Students' Long-Term Success

Kindergarten Readiness[5]

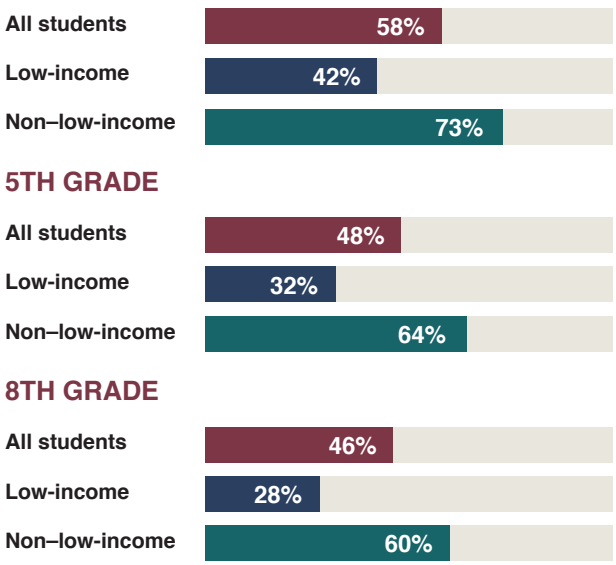
About **64%** of incoming kindergarteners demonstrated "kindergarten readiness" in math among students assessed by WaKIDS, 2018–19.

Students who have developed kindergarten readiness in math and literacy are 30% more likely to meet standards in 3rd grade math and English language arts assessments.

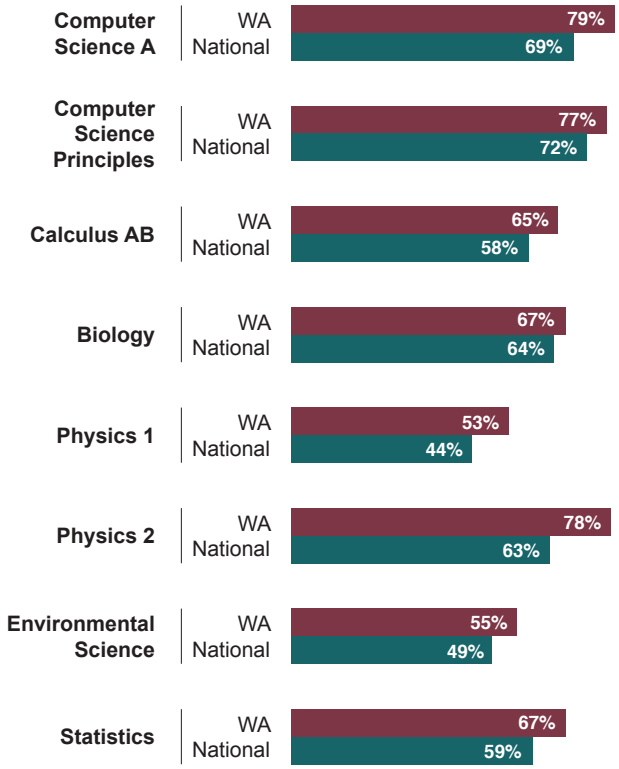
Smarter Balanced Assessment Scores Reveal a Need for More Support for Low-Income Students

Math Scores, 2019[6]

Percent meeting math standard



2019 AP Exam Pass Rates for Washington Students Consistently Exceed National Averages[7]



AP Computer Science Offerings Are Growing but Access is Still Limited[8]

In 2019, **155** Washington high schools offered AP Computer Science courses, up from just 21 schools in 2011.

The number of students taking the AP Computer Science exam has grown from 1,048 in 2014 to **2,113** in 2019.

Yet, despite this progress less than 36% of high schools offering AP currently have AP courses in computer science.

★ STEM Degree Completions are Increasing but Still Not Keeping Pace with Rising Workforce Demand

STEM degree and long-term certificate completions have shown steady increases from 2014 to 2019.[9]

At the Mid-level:

Degree and certificate completions in STEM fields increased by more than **14%**.

At the Baccalaureate Level:

Completions in Computer and Information Sciences grew by **70%**, in Engineering by **9%**, in Health by **15%**, and in all other STEM fields by **6%**.

At the Graduate Level:

Degree and certificate completions in Computer and Information Sciences grew by **65%**, in Engineering by **11%**, in Health by **22%**, and in all other STEM fields by **19%**.

But limited enrollment capacity remains a barrier to further advancement in some fields, particularly in computer science.

Rapidly growing workforce demand is still outpacing STEM degree production.

- There is a **widening gap** between projected annual job openings in STEM fields and the number of graduates in Washington prepared to fill them. Looking at all education levels combined — mid-, baccalaureate, and graduate — projections for the years 2022–2027 estimate that:[10]

◊ In Computer Occupations, out of a total of more than **14,000 annual job openings**, there will be 10,000 more openings than there are graduates completing degree programs each year prepared to fill them.

Graduates prepared for computer science jobs

Unfilled computer science jobs

◊ In Engineering and Related Technical Fields, out of a total of about **3,800 annual job openings**, there will be more than 1,600 more openings than there are graduates prepared to fill them.

Graduates prepared for engineering jobs

Unfilled engineering jobs

◊ In Health Fields, out of a total of more than **20,000 annual job openings**, there will be nearly 10,000 more openings than there are graduates prepared to fill them.

Graduates prepared for jobs in health fields

Unfilled jobs in health fields

★ Underrepresented Populations Continue to Face Challenges in STEM

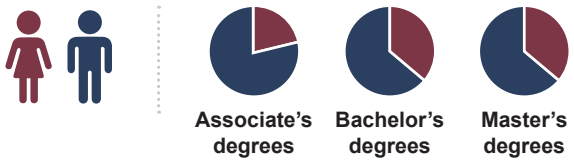
A gender imbalance in STEM achievement tends to widen as students move through their education.

- Among pre-K students, girls tend to do as well as boys in math, with about **64%** demonstrating "kindergarten readiness" in the 2018–19 WaKIDS assessment.[11]

Ready for K

- As they advance in their education, however, interest and achievement in key STEM subjects tends to fade for female students. In 2018, only **47%** of students completing AP Calculus exams and **28%** of students completing AP Computer Science exams were female.[12]

- Male students also complete STEM degrees in greater numbers than female students. In 2018, only **23%** of students completing associate degrees, **40%** of students completing bachelor's degrees, and **41%** of students completing master's degrees in STEM fields were female.[13]



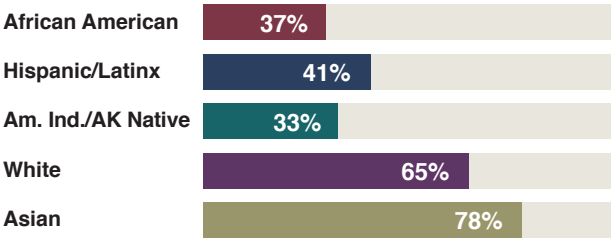
- In Computer Science & Information Technology, only **19%** of students completing degrees or certificate programs were female.

Students from underserved minoritized families are disadvantaged at all stages along the STEM pathway.[14]

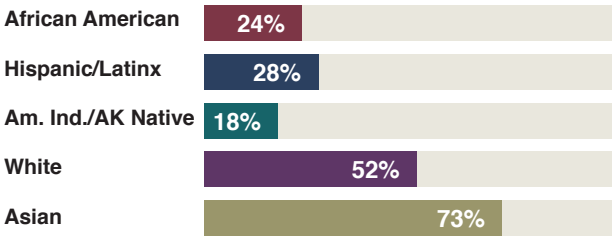
- 2019 Smarter Balanced math assessment scores show the results of the challenges minoritized students face and their need for more support services:

Percent meeting standard

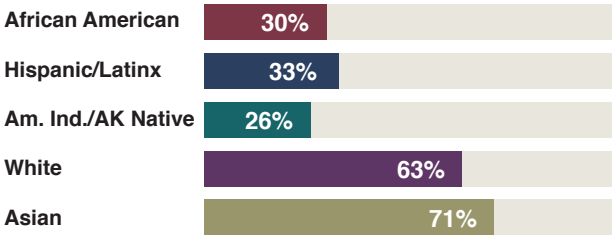
3RD-GRADE MATH



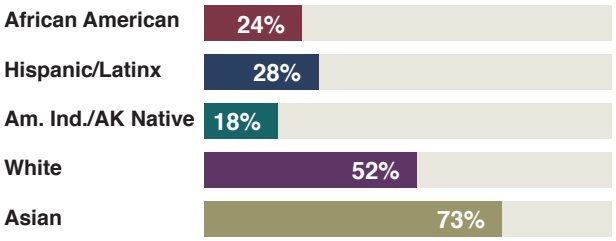
5TH-GRADE MATH



5TH-GRADE SCIENCE

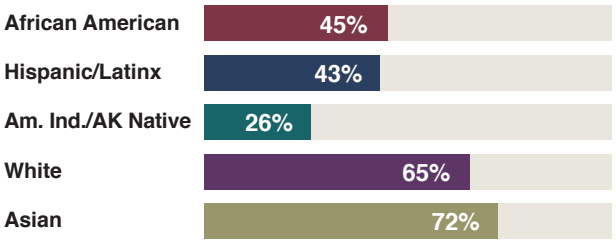


8TH-GRADE MATH

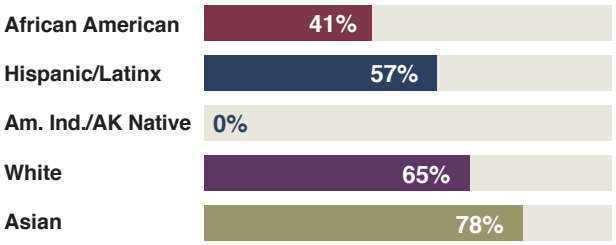


- AP exam pass rates in key STEM subjects show a similar pattern, revealing the difficult road many minoritized students face in becoming prepared for college-level studies[15]:

AP CALCULUS



AP COMPUTER SCIENCE



THE STEM ALLIANCE'S IMPACT

The STEM Education Innovation Alliance advises the Governor and Legislature on strategic planning and public policy to expand opportunities and improve STEM education in Washington. In 2019, in collaboration with its partners, the STEM Alliance advocated for and helped pass groundbreaking legislation that will have a transformative impact.

2019 — A Historic Breakthrough Year for Higher Education in Washington

- ✓ Key legislation forged major advances in financial aid that will improve STEM access and affordability.
- ✓ The Workforce Education Investment Act (E2SHB 2158) established the Washington College Grant, which replaces the State Need Grant and guarantees funding for all eligible students beginning with the 2020-21 year.
- ✓ This bill also revises the eligibility threshold to extend financial aid to middle class families and expands its applicability to include apprenticeships and a range of certificate programs.
- ✓ Expansion of the Washington State Opportunity Scholarship. Beginning in 2019, the Career and Technical Scholarship (CTS) were extended to students in certificate, apprenticeship, and associate degree programs in the trades, STEM, or health care fields at one of Washington's 34 community and technical colleges.
- ✓ The State Legislature provided $24 million for the biennium to support the Governor's Career Connect Washington initiative, designed to expand work-based learning, career exploration, career preparation, and career launch opportunities for Washington students.
- ✓ $32.1 million were invested to expand the Guided Pathways model of advising, course sequencing, and student support to improve retention and completion rates for students in the Community and Technical College system.
- ✓ Programs for science teacher training in Next Generation Science Standards (NGSS) and climate science were provided with $4 million in the 2018-19 budget, as part of the ClimeTime program, coordinated by the Office of the Superintendent of Public Instruction and the UW Institute for Science + Math Education.

Advocating for Future-Ready STEM Education

Student in web design program at Clark College

IMAGE COURTESY OF CLARK COLLEGE

Students in Aviation Maintenance Technician School

IMAGE COURTESY OF EVERETT COMMUNITY COLLEGE

ENDNOTES

[1] CNBC. (2019) Top 10 States Winning the Talent War. Retrieved December 19, 2019 from https://www.cnbc.com/2019/07/10/the-top-10-states-winning-the-talent-war-in-2019.html.

[2] CNBC, Ibid.

[3] Geekwire. (2019) Seattle and Los Angeles Lead STEM Job Growth. Retrieved December 16, 2019 from https://www.geekwire.com/2019/seattle-los-angeles-lead-stem-job-growth-u-s/.

[4] CNBC. (2019) Top States for Business, 2019. Retrieved November 29, 2019 from https://www.geekwire.com/2019/seattle-los-angeles-lead-stem-job-growth-u-s/.

[5] Washington State Office of Superintendent of Public Instruction, Report Card. Washington Kindergarten Inventory of Developing Skills (WaKIDS).

[6] Washington State Office of Superintendent of Public Instruction, Report Card. Smarter Balanced Assessments.

[7] College Board. AP Program Participation and Performance Data 2019.

[8] College Board. AP Program Participation and Performance Data 2019.

[9] Integrated Postsecondary Education Data System (IPEDS), National Center for Education Statistics.

[10] Washington Student Achievement Council (WSAC) analysis of IPEDS, 2019 Census PUMS data, ESD long-term employment forecast, and Emsi job openings projections.

[11] Washington State Office of Superintendent of Public Instruction, Report Card. Washington Kindergarten Inventory of Developing Skills (WaKIDS).

[12] College Board. AP Program Participation and Performance Data 2018.

[13] Integrated Postsecondary Education Data System (IPEDS), National Center for Education Statistics.

[14] Tesha Sengupta-Irving & Shirin Vossoughi (2019) Not in their name: re-interpreting discourses of STEM learning through the subjective experiences of minoritized girls, Race Ethnicity and Education, 22:4, 479-501, DOI: 10.1080/13613324.2019.1592835.

[15] College Board. AP Program Participation and Performance Data 2018.

STEM EDUCATION INNOVATION ALLIANCE

The STEM Education Innovation Alliance, legislatively created in 2013 [E2SHB 1872], brings together leaders from a broad range of business, labor, education, government, and nonprofit organizations, with the role of advising Washington's Governor and Legislature on policy and strategic planning in support of STEM education initiatives.

Mission

The STEM Education Innovation Alliance is committed to promoting innovative policies that will enhance STEM education and career pathways, advance economic development, meet our state's urgent workforce demands, incentivize regional public and private partnerships, and provide opportunities for more Washingtonians to compete for jobs in this vital high-wage sector.

Goals

- ✓ Inspire youth through career connected and real-world STEM learning opportunities.
- ✓ Provide every K–12 student access to computer science education.
- ✓ Prepare Washington's future workforce by increasing attainment of technical credentials, two- and four-year degrees, and contributing to Washington's 70% postsecondary education attainment goal.
- ✓ Improve equity by implementing interventions to close educational opportunity gaps from cradle to career, providing excellent preparation and support for STEM teachers and improving workforce diversity.
- ✓ Raise public awareness and support for STEM.

STEM ALLIANCE MEMBERSHIP

2019 Washington State Teacher of the Year
Robert Hand

Amazon
Mariana Holliday

Association of Washington School Principals
Scott Friedman

Ballmer Group
Andi Smith

Bill & Melinda Gates Foundation
Lindsay Hunsicker

Career Connect Washington
Maud Daudon

The Center for Educational Effectiveness
Gene Sharratt

Citizen Members
Marcie Maxwell and Kevin Wang

Code.org
Hadi Partovi

College Success Foundation
James Dorsey

Community Colleges of Spokane
Christine Johnson

Council of Presidents
Paul Francis

Eastern Washington University Student Member
Francisco Ramirez

Everett Public Schools
Dana Riley Black

FIRST (For Inspiration and Recognition of Science and Technology) Washington
Erin McCallum

Greater Spokane Inc.
Alisha Benson

Independent Colleges of Washington
Terri Standish-Kuon

Microsoft Philanthropies
Jane Broom Davidson

Microsoft Philanthropies Technology Education and Literacy in Schools Program
Patrick O'Steen

North Central Educational Service District
Sue Kane

Office of Superintendent of Public Instruction
Chris Reykdal

Pacific Education Institute
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Pacific Northwest National Laboratory
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Jeff Estes and Randy Spaulding

Washington State Department of Children, Youth and Families
Ross Hunter

Washington State Department of Commerce
Lisa Brown

Washington State Department of Labor & Industries
Joel Sacks

Washington State Employment Security Department
Suzi LeVine

Washington State Labor Council
Larry Brown

Washington State Office of the Governor
John Aultman

Washington State Opportunity Scholarship
Kimber Connors

Washington STEM
Angela Jones

Washington Student Achievement Council
Mike Meotti

Washington Workforce Training and Education Coordinating Board
Eleni Papadakis

Wenatchee Valley College
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