

# Vision 2021: Investing in a Future Ready Washington



**Strategic Action Plan Prepared  
by the Washington State STEM  
Education Innovation Alliance**

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# TABLE OF CONTENTS

Executive Summary	3
The STEM Imperative for Washington State	4
Background on Current Efforts Underway	4
Call to Action	5
Goals	5
1. Deliver Career Connected Learning	6
2. Provide Computer Science Education	7
3. Achieve Washington's 70% Grad Goal	8
4. Improve Equity	10
5. Raise Support for STEM	11



## EXECUTIVE SUMMARY

What skills will Washingtonians need to thrive in a vibrant Washington economy? Washington's communities are home to global STEM industry leaders and innovators. Washington-based companies in fields such as aerospace, agriculture and natural resources, clean energy, high-tech, health sciences, and advanced manufacturing are changing lives here at home and across the world. The state's ability to attract, develop, and retain STEM talent is vital for fostering opportunity for every Washingtonian and economic growth innovation and competitiveness. Washington state ranks #1 nationally in the concentration of STEM related jobs (source: Council of State Governments, 2015) yet ranks 47th in the nation (source: Washington State Council of Presidents, Washington Competes, October, 2016) and last among high-tech-intensive states in the proportion of high school graduates who go directly to college.



It is clear that many young Washingtonians are not on a path to participate in a Future Ready economy.

To achieve an innovative and dynamic workforce, and to address gaps between degree production and employer demand in key fields, the Governor's strategic plan supports leaders to advance a STEM education vision that is equitable, accessible, and supported over the next five years. The success of this plan will be a major contributor to achieving the state's 70 percent postsecondary attainment goal.

**Rationale:** Resources, activities, and policies—local, state, federal, and private—are not focused or aligned to address the state's STEM challenges. A strong and vibrant Washington state economy requires greater coordination from cradle to career, smarter investments, and measurable results.

The Governor's plan builds upon the 2015 STEM Framework for Action and Accountability by releasing an aligned strategic plan to spur high-priority actions and measure progress. This plan provides focused goals and a short list of actionable items, including public-private partnerships and multi-sector networks to spur greater alignment, coherence, and innovation.

To **accelerate progress**, we are recommending **five actionable goals** for immediate attention:

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

Next year, an update and report on progress will be made using the STEM Report Card - [STEM.WA.GOV](https://www.stem.wa.gov).



## THE STEM IMPERATIVE FOR WASHINGTON STATE

From Puget Sound to eastern Washington, our economy is rooted in innovation. We currently rank first in the nation in concentration of STEM jobs, employing more than 9 percent of the state's total workforce in the STEM sector. Of Washington's top 25 occupations, 11 of our top available jobs this year are STEM-related and comprise more than half (approximately 28,000) of the nearly 48,000 open jobs across the state (source: <https://fortress.wa.gov/esd/employmentdata/docs/occupational-reports/top-25-occupations-advertised-online-march-2016p.pdf>) With multiple pathways to these STEM jobs—postsecondary certification programs, two-year technical degrees and four-year university degrees—our young people will be poised to lead the way for the U.S. in fields as varied as clean energy, computer science, maritime engineering, agriculture and natural resources, horticulture, health care, and medical research.

Reaching the state attainment goal stipulated in the Washington Student Achievement Council Strategic Plan of “at least 70% of adults ages 25-44 in Washington State will have a postsecondary credential” is contingent upon STEM success due to the anticipated increase in degrees needed to fill STEM jobs. To meet Washington's workforce needs, Future Ready Washington students must be prepared for STEM careers or equipped with STEM literacy if not choosing a STEM career.

## BACKGROUND ON CURRENT EFFORTS UNDERWAY

The Governor's STEM Education Innovation Alliance (the STEM Alliance), created by House Bill 1872, established a comprehensive initiative to increase learning opportunities and improve educational outcomes in science, technology, engineering, and mathematics through multiple strategies and statewide partnerships. The STEM Alliance is a key leadership group that advises the Governor and, in 2015, adopted a STEM Framework for Action and Accountability to outline strategic objectives for the state.

Washington STEM, a nonprofit dedicated to advancing excellence, equity, and innovation



in STEM education in Washington state, raises the profile and public demand for STEM through regional STEM Networks, innovation, and policy partnerships. Washington STEM supports 10 community-led regional STEM Networks around the state, which collectively reach 50 percent of the K-12 students in the state. Each regional STEM Network is comprised of local education, business, and community groups that agree upon common goals and agree to align resources, activities, and partnerships to accelerate progress for students. The time is right for a coordinated public-private partnership approach.

In 2013, Governor Inslee signed House Bill 1472, opening the door for schools across the state to count advanced placement computer science as a math or science credit. The law's goal is to improve and expand access to computer science education, a high-demand skill in Washington's technology-fueled economy. Substitute House Bill 1813 (2015) directed the Office of Superintendent of Public Instruction (OSPI) to adopt K-12 education standards for computer science, created a K-12 computer science teaching endorsement, and enabled teachers to access state scholarships when pursuing computer science professional development.

The commitment to computer science continued in 2016 with the Governor's Computer Science for All initiative and partnership to promote K-12 computer science education policy goals for states.



## CALL TO ACTION

**MISSION:** All stakeholders will work in collaboration committed to ensuring that Washington has a world-class STEM education system that improves career and college readiness, improves affordability and equitable access to postsecondary STEM degrees, increases college completion, and meets workforce demands.

**VISION:** All Washingtonians have the STEM skills necessary to live a life of opportunity and success in the state's thriving innovation economy and **democratic society by leading the nation in STEM literacy for all and a diverse, world-class workforce.**

## GOALS

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



# GOAL 1: Inspire youth through career connected and real-world STEM learning opportunities.

## Current Status

Students, especially girls, students of color, students in rural communities, and students from low income backgrounds, often do not receive knowledge about STEM career pathways during their K-12 experience, nor do they engage in attendant activities such as career networking events, internships, and job shadowing.

Washington state adopted the Next Generation Science Standards (NGSS), which include engineering practices. Teachers report a lack of high-quality professional development and resources, and that quality STEM professional development and access to industry partnerships are not equitably available across Washington.

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STEM pathways are not coherent and aligned between K-12 and postsecondary settings. Accordingly, students do not have access to relevant career pathway information at the times when they need to make critical decisions.

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Career and Technical Education offerings are not fully aligned with the state's high-demand, family wage employment projections and are not consistently available from district to district.

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Access to career pathways in high-skill, high-demand sectors are defined as students in grades 7-12 enrolled in school districts that offer at least one course in high-demand career pathway, either at a school in their home district or a Skills Center affiliated with the school district. Career pathways in high-skill, high-demand sectors include those occupations where demand exceeds supply, based on the Occupational Employment Survey conducted by the Employment Security Department and Bureau of Labor Statistics.

## Actions Needed

*Actions will be measured and tracked on an annual basis*

Forge public-private partnership with Washington STEM to provide career connected learning experiences K-12 through multi-sector regional collaborations designed to increase apprenticeships, internships, and other experiences that help prepare all students for high-demand family wage careers.

Work in partnership with OSPI, Regional Science Coordinators, and LASER to support existing science kit distribution centers, upgrade science instructional materials and "kits" to align with NGSS, embedding engineering through industry- and place-based design challenges, and provide aligned PD, thus providing equitable access to all regions. Establish long-term, steady, reliable, and consistent funding to support the full continuum of STEM education, from early learning through postsecondary and workforce training, to ensure that students are prepared to pursue their goals and keep Washington's world-class economy strong.

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Work in partnership with OSPI to foster STEM pathways and associated course development; ensure coordinated and seamless planning across K-12, the community college system, higher education institutions, and workforce development.

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Fully fund CTE and optimize CTE programs to prepare students in high-demand family wage jobs leading to careers; place emphasis on CTE as a viable and accessible option to traditional pathways.

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In collaboration with OSPI, by the 2018-19 school year, work towards developing and implementing a process for scaling or phasing out pathways that don't lead to credentials in high-skill, high-demand programs. State and local employer needs should drive CTE course approvals and district offerings.



## Current Status

As a result of NGSS, CTE and STEM programs there is significant overlap in STEM subject content (environment, agriculture and natural resources) and the need exists to expand career connected learning.

## Actions Needed

Forge public private partnership with Washington STEM and Pacific Education Institute (FieldSTEM) to provide career connected learning experiences K-12 through multi-sector regional collaborations.

Provide incentives for CTE and STEM leadership to integrate programs



## **GOAL 2: Provide every K-12 student equitable access to computer science education.**

### **Current Status**

The Legislature provided \$4M public-private computer science grant fund that impacted 11 percent of K-12 schools.

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Grant funding exists for district technology and has increased computer science professional learning and resources for educators.

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At the elementary level, computer science access is limited.

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HB 1813 mandates the Superintendent of Public Instruction to adopt nationally recognized computer science learning standards in K-12.

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Governor's Computer Science for All initiative

### **Actions Needed**

Work in partnership with OSPI to: accelerate state and private investment in computer science with a goal of reaching at least 50 percent of Washington students in the next three years; and embed computer science in basic education, integrating it into core subjects to provide a real world context for learning/mastering CS tools and their analytical capacity.

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Ensure all high schools offer an introductory computer science course and that K-12 schools build capacity to provide computer science education at all levels.

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Streamline process for high school teacher computer science endorsement including competency-based options; institute computer science "micro-credential" for elementary and middle school teachers; expand pre-kindergarten through fifth grade student opportunities to develop computational thinking skills by creating incentives; embed computer science training in teacher preparation programs; promote effective computer science professional development and teacher training programs such as TEALS and Code.org.

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Work in partnership with OSPI to create a computer science vision and continue to refine an implementation plan that includes PreK-5 student opportunities to develop computational thinking by creating incentives.

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Train and deploy Computer Science Educator Fellows with a priority on schools serving high poverty populations; create models and tools to enable scale-up of best practices. Amend state policy to ensure ample supply of computer science teachers.



### **GOAL 3: Prepare Washington’s future workforce by increasing attainment of technical credentials, two- and four-year degrees and contributing to Washington’s 70 percent attainment goal.**

#### **Current Status**

Students enrolled in dual-credit programs are more likely to complete high school and continue on to postsecondary education. However, differences in participation and completion by race, ethnicity, and income continue to persist. For example, Hispanic students make up 19 percent of the total population, yet are represented at rates of 12 percent in Advanced Placement and Running Start programs, and 13 percent in College in the High School Programs. (Dual Credit Report, WSAC, October, 2016.)

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There are bottlenecks in high-demand and priority workforce courses and barriers to appropriate student time to degree. Often, students have not taken the appropriate coursework, especially in math, to support appropriate time to degree. In addition, federal funds for fee waivers for advanced placement (AP) exams may no longer be available as a result of ESSA and restructuring of federal grants. (Dual Credit Report, WASC, October, 2016.)

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Affordability can be a barrier to access and attainment of high-demand STEM credentials and degrees. In particular, constant uncertainty about the cost of college undermines the ability of families to plan for and support students as they pursue college degrees. Low-income and first generation families are especially sensitive to these threats and are more likely to limit college enrollment based on perceptions about cost. (Source: 2013 Diversity Report, WSAC.)

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#### **Actions Needed**

In partnership with OSPI develop alternative course equivalencies (such as CTE); increase dual credit programs, expand funding for College in the High School to serve all qualified students and provide greater access to the advanced coursework necessary for success in STEM majors; improve communication about dual-credit opportunities.

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In partnership with OSPI, ensure appropriate support and enhance time to degree; foster private-public partnerships that support effective pathways; ensure support for AP and dual credit programs.

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Provide support for students with stipends and/or student aid in pre-apprenticeship programs as they prepare to enter programs such as the Registered Tech Apprenticeship program developed by Washington Technology Industry Association (STEM Education Innovation Alliance Recommendations to the Governor, September 27, 2016); further promote and expand the Washington State Opportunity Scholarship (WSOS) to underrepresented students. Actively identify and remove barriers for submission of an WSOS application.

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## Current Status

Postsecondary pathways for historically underserved populations, transfer students, veterans, and adult learners lack support.

MESA has been successfully piloted at 6 of 34 community colleges.

Washington state is developing a state plan to implement the federal Every Student Succeeds Act. The Act explicitly names STEM with hands-on learning and field-based or service learning and computer science as priorities and specifies allowable uses of federal funds.

## Actions Needed

Strengthen pathways for historically underserved populations, transfer students, veterans, and adult learners; expand the MESA program to make it available at every community college in Washington; increase funding for State Work Study and allow colleges to create new mentor partnerships with K-12 schools by allowing 100 percent match rates for programs that enable college students to help at-risk secondary school students; expand computer science Bachelor of Science degree availability.

Foster public-private partnerships that support effective pathways.

Prioritize STEM and computer science for PreK-12 within the state's Every Student Succeeds Act (ESSA) implementation plan. This action will incentivize local school districts to use federal funds to expand STEM and computer science offerings through public-private partnerships with organizations like Washington STEM and align OSPI supports.

Prioritize STEM, Computer Science and environmental literacy within the state's ESSA implementation plan.





## **GOAL 4: Improve equity by implementing interventions to close educational opportunity gaps from cradle to career, providing world-class preparation and support for STEM teachers and improving workforce diversity.**

Current Status	Actions Needed
<p>Washington students are not prepared in the area of early math which is also the area where the greatest disparities exist by race and income.</p> <p>Rural students struggle to see a future where they live, and communities need innovative youth to fulfill the promise of the growing and essential agriculture and natural resource sectors.</p>	<p>Ensure mathematics teachers in the early grades have deep content knowledge; increase professional development and support for early childhood educators in the formal early learning system as well as increasing confidence and support for parents and caregivers (guiding adults who play a critical role in a child's exposure to early math) by supporting public-private partnerships with organizations such as Washington STEM and Thrive; increase STEM mastery of elementary school teachers.</p>
<p>Exposure to science education varies widely across elementary schools with an average of 2.3 hours per week spent on science instruction. (Source: Changetheequation.org)</p> <p>In 2015, 60.8% percent of incoming kindergarten students demonstrated the math skills expected of five-year olds; when disaggregated by low income, this number dropped to 49.4%. (Source: OSPI Report Card, 2015)</p>	<p>Develop instructional materials that build on the strength of the current K-5 "kit" system, supplement those materials to support engineering practices through design challenges and feature the work of local industry across the state; develop and offer mathematics specialization for teachers in grades K-3 along with incentives to attract teachers into this specialization.</p>
<p>For many students of color, students who receive special services, students who are English language learners, and students who are low income, homeless, or in foster care, graduation rates are low when compared to the rate for all students.</p>	<p>Continue to support the Educational Opportunity Gap Oversight and Accountability Committee (EOGOAC) and programs that address the opportunity gap in Washington and make recommendations to expand pathways and strategies to prepare and recruit diverse teachers and administrators.</p>
<p>There are limited role models for many students of color and females in STEM due to a lack of diversity in the workforce; women leave tech companies at a higher rate than men and fewer African Americans and Latinos with degrees in tech-related subjects are successful in securing employment.</p>	<p>Support career-connected learning, especially in fields with underrepresented populations; implement and support K-12, secondary and innovative workforce development opportunities and workforce diversity retention programs such as free or reduced cost apprenticeships, MESA, Ada, and the Washington Technology Industry Association's apprenticeship program.</p>
<p>Variation exists across Washington's teacher preparation programs, particularly in STEM specific preparation.</p> <p>Retention of high-quality STEM teachers is challenging and many leave teaching during the first five years.</p>	<p>Increase the professional status of STEM teachers and support incentivized compensation; launch team of STEM "Master Teacher Corps" or STEM Ambassadors; provide ongoing support to STEM teachers through promoting and funding relevant, engaging, job-embedded, and high-quality professional development options.</p>

## GOAL 5: Raise public awareness and support for STEM.

### Current Status

Public demand for STEM is high: 94 percent of Washington voters believe every child should have access to a high-quality science, technology, engineering, and math (STEM) education in the state's K-12 public schools, but just 45 percent believe that is happening today. (Source: 2015 Washington STEM poll)

Washington STEM supports ten regional STEM Networks to support the STEM pipeline in their local context through early learning and K-12 professional learning, business and higher education partnerships, and communications and advocacy.

Communities, families, and students have inequitable access to STEM opportunities, access, and information.

The uneven distribution of STEM education assets usually concentrates in the state's population centers, disadvantaging rural students, learners in low socio-economic regions, and under-represented minorities, resulting in a condition of haves and have-nots.

### Actions Needed

Increase funding and support of a statewide network and regional networks through a public-private partnership; ensure successful models of education-private enterprise partnerships and models of successful STEM Teacher Leader programs are highlighted, brought to scale, and used as models for replication.

Support regional STEM Networks and partners to inspire students and help students and families explore careers through innovative marketing campaigns, community based STEMfests, and technology based apps and tools.

Enable the Pacific Education Institute to develop signature place-based agriculture and natural resource systems projects in regions (Coast, Puget Sound and Columbia River) through a coalition of education, government and industry partners.

Equip parents and teachers with STEM-related Washington-specific career information for creating awareness and interest among children and students; Washington STEM and Washington MESA to continue developing and scaling industry-based challenges that engage teams comprised of regional STEM education leaders, engineering industry professions, higher education partners and teachers to identify regionally-relevant engineering design challenges.