educationfirst

Making the Most of ESSA: Opportunities to Advance STEM Education

A Review of ESSA Plans for Innovations in Science, Technology, Engineering and Math

July 2017

Education First, with the support of Overdeck Family Foundation, developed this resource to help policymakers, district and school leaders, and advocates learn how states are using ESSA to support STEM education and how they can push those ideas further

Why We Created This Resource

This resource is intended to **spark a sense of possibility** and offer some **concrete examples** from state Every Student Succeeds Act (ESSA) plans. It is **not** intended to be an exhaustive set of policy recommendations.

This resource reflects trends, innovations and exemplars focused on STEM education captured from 25 draft and submitted ESSA plans, as well as strategies from STEM experts.

We hope this information will influence **your work** and **jump-start important conversations about how you can use ESSA to better support STEM education** in your state.

Who We Are

We are **Education First,** a national, mission-driven strategy, policy and grantmaking effectiveness organization with unique and deep expertise in P-20 education.

We are deeply engaged in supporting states to develop their ESSA plans through policy formation, analysis, stakeholder engagement, plan writing and reviews of drafts.

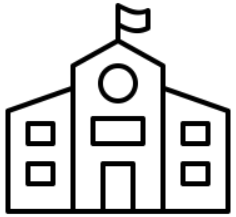
Our ESSA work is with clients such as the Council of Chief State School Officers, Communities In Schools and direct ESSA plan development and stakeholder engagement in over 18 states.*

* Please see Appendix for a selection of our ESSA publications.

Audiences will find different uses for this resource depending on their needs

For State Policymakers

- Provide ideas and inspiration for ESSA plans that are not yet submitted
- Provide suggestions for implementing policies already contained in ESSA plans
- Provide promising policies that could be implemented in your state
- Facilitate connections with partner organizations eager to support STEM education in your state



For District Officials and School Leaders

- Provide ideas for driving equity at the school and district level
- Provide ideas for accessing federal funds in service of STEM
- Encourage the development of partnerships with local organizations to support STEM education
- Encourage the strategic use of data

For Advocates

- Identify opportunities for advocacy in your states based on what is (or is not) contained in ESSA plans
- Suggest policies to prioritize in advocacy efforts
- Suggest principles and research to guide and inform the development of new STEM policies and practices

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1 | Background

High-quality STEM education is necessary to grow our economy, meet workforce needs and inspire young minds

The national annual average wage for STEM occupations is **roughly 1.7 times** that of all occupations

The United States is expected to need an additional **1 million STEM jobs by 2022**

As of 2011, **nearly 26 million jobs—20 percent of all jobs**—require a high level of knowledge in a STEM field

STEM education also fosters creativity, critical thinking and problem-solving skills—all of which are critical for facing the challenges of our modern society.

Sources: National Bureau of Labor Statistics, https://www.bls.gov/opub/btn/volume-3/an-overview-of-employment.htm; President's Council of Advisors on Science and Technology, https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/pcast-executive-report-final_2-13-12.pdf; Jonathan Rothwell, Brookings Institute, The Hidden STEM Economy (2016). https://www.brookings.edu/wp-content/uploads/2016/06/TheHiddenSTEMEconomy610.pdf

Unfortunately, access to high-quality STEM education is deeply inequitable—and that is reflected in our STEM workforce

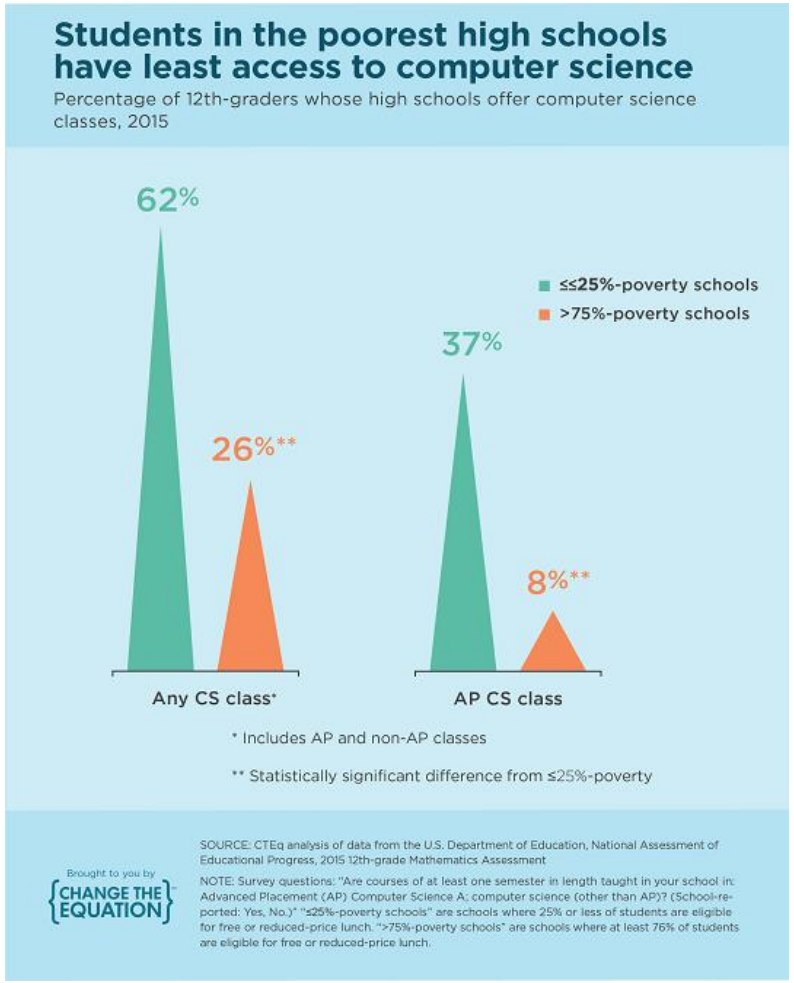


Table 3-19 Racial and ethnic distribution of U.S. residents, and of employed individuals in S&E occupations, with S&E degrees, and with college degrees: 2013

(Percent)

Race and ethnicity	S&E occupations	S&E highest degree holders	College degree holders	U.S. residential population[a]
Total (*n*)	5,749,000	12,446,000	43,839,000	229,000,000
American Indian or Alaska Native	0.2	0.3	0.3	0.6
Asian	17.4	13.5	8.4	5.2
Black	4.8	5.8	7.2	11.7
Hispanic	6.1	7.9	7.7	14.6
Native Hawaiian or Other Pacific Islander	0.2	0.3	0.3	0.1
White	69.9	70.5	74.6	66.2
More than one race	1.5	1.6	1.5	1.6

[a] Age 21 and older.

NOTES: Hispanic may be any race. American Indian or Alaska Native, Asian, black or African American, Native Hawaiian or Other Pacific Islander, white, and more than one race refer to individuals who are not of Hispanic origin.

SOURCES: Census Bureau, American Community Survey (ACS) (2013); National Science Foundation, National Center for Science and Engineering Statistics, Scientists and Engineers Statistical Data System (SESTAT), and National Survey of College Graduates (NSCG) (2013), http://sestat.nsf.gov.

Science and Engineering Indicators 2016

Sources: Change the Equation, http://changetheequation.org/ending-double-disadvantage; National Science Foundation, https://www.nsf.gov/statistics/2016/nsb20161/uploads/1/6/chapter-3.pdf

The Every Student Succeeds Act (ESSA), passed in 2015, gives more autonomy to states than No Child Left Behind. This provides an opportunity for states to improve and expand STEM education while driving equity

Sources: http://abcnews.go.com/images/US/GTY_george_w_bush_12_jtm_141229.jpg; http://fullframe.edweek.org/2015/12/21/a-photographers-view-of-the-essa-signing/

Title I, Title II and Title IV of ESSA contain the most promising opportunities for STEM

Title I
(Accountability and School Improvement)

- Using STEM indicators in state accountability systems
- Supporting STEM instruction in Title I schools
- Providing struggling students opportunities for expanded learning time, before- and after-school programs and summer programs

Title II
(Teacher Training and Support)

- Training STEM educators to teach new concepts
- Providing stipends to recruit STEM educators
- Supporting preschool and elementary educators in incorporating STEM into their classrooms

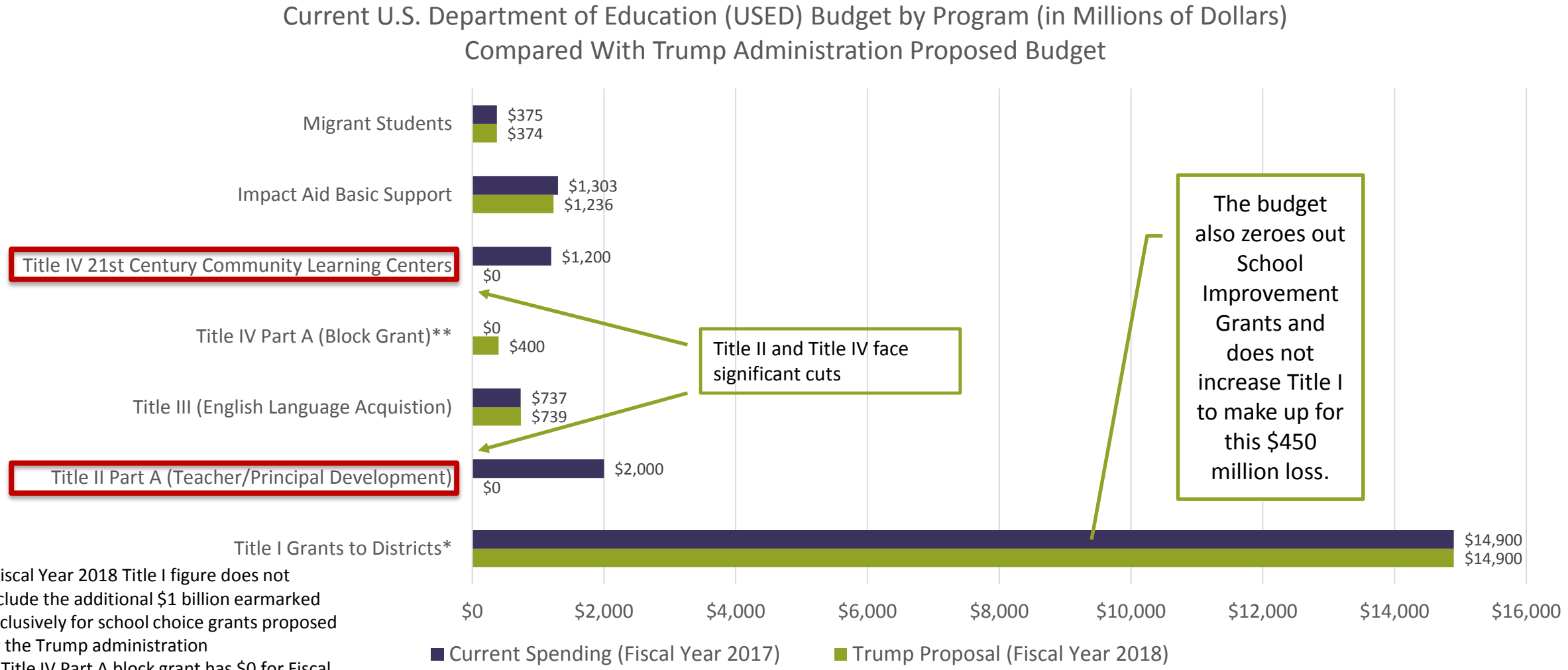
Title IV
(Student Supports/21st Century Community Learning Centers)

- Expanding high-quality STEM courses
- Increasing access to STEM for underserved and at-risk populations
- Integrating formal and informal STEM education (through 21st Century Community Learning Centers and elsewhere)

Source: National Science Teachers Association, http://static.nsta.org/pdfs/ESSAOverview.pdf

* Note: These examples are meant to be illustrative and are not comprehensive. See more from the National Science Teachers Association here.

Though unlikely to pass as is, the Trump administration's budget proposal cuts areas with a high likelihood of STEM activity, particularly Title II and Title IV



*Fiscal Year 2018 Title I figure does not include the additional $1 billion earmarked exclusively for school choice grants proposed by the Trump administration

**Title IV Part A block grant has $0 for Fiscal Year 2017 because it is a new block grant starting in 2018

Source: Adapted from Education Week, http://blogs.edweek.org/edweek/campaign-k-12/2017/05/trump_budget_would_slash_Education_Dept._Spending_Boost_School_Choice.html

2 | Methodology

Our review of 25 draft and submitted ESSA plans and expert interviews revealed a number of common, high-impact policies that trended throughout the plans

Background Research → **Data Analysis** → **Recommendations**

Background Interviews
We interviewed experts about what STEM opportunities they had seen in ESSA plans, the types of policies we should look for and the draft plans most likely to contain innovative proposals

Plan Reading
We read 25 submitted and draft state ESSA plans and tracked instances of STEM, looking particularly for innovative policies and trends

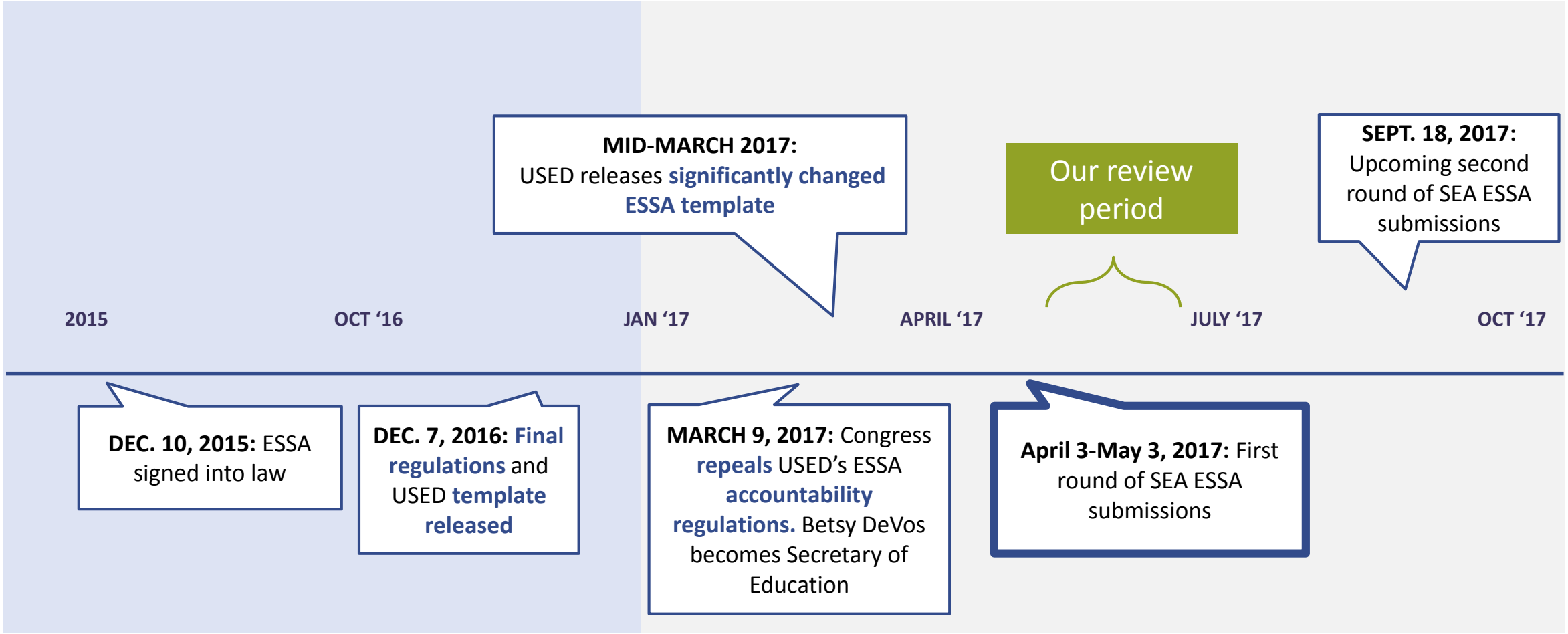
Identifying Trends
While states did propose some unique STEM ideas, we were more struck by the number of policies that appeared in multiple plans—policies that, if implemented well, could advance access to and equity in STEM education for millions of students. We selected four policies as focus points for the publication, and we sampled a few states for innovations or other uses of STEM

Expert Interviews
We spoke with STEM experts on how to best implement the four most popular STEM policies to improve STEM education while promoting equity. We featured their recommendations for each of the four policies

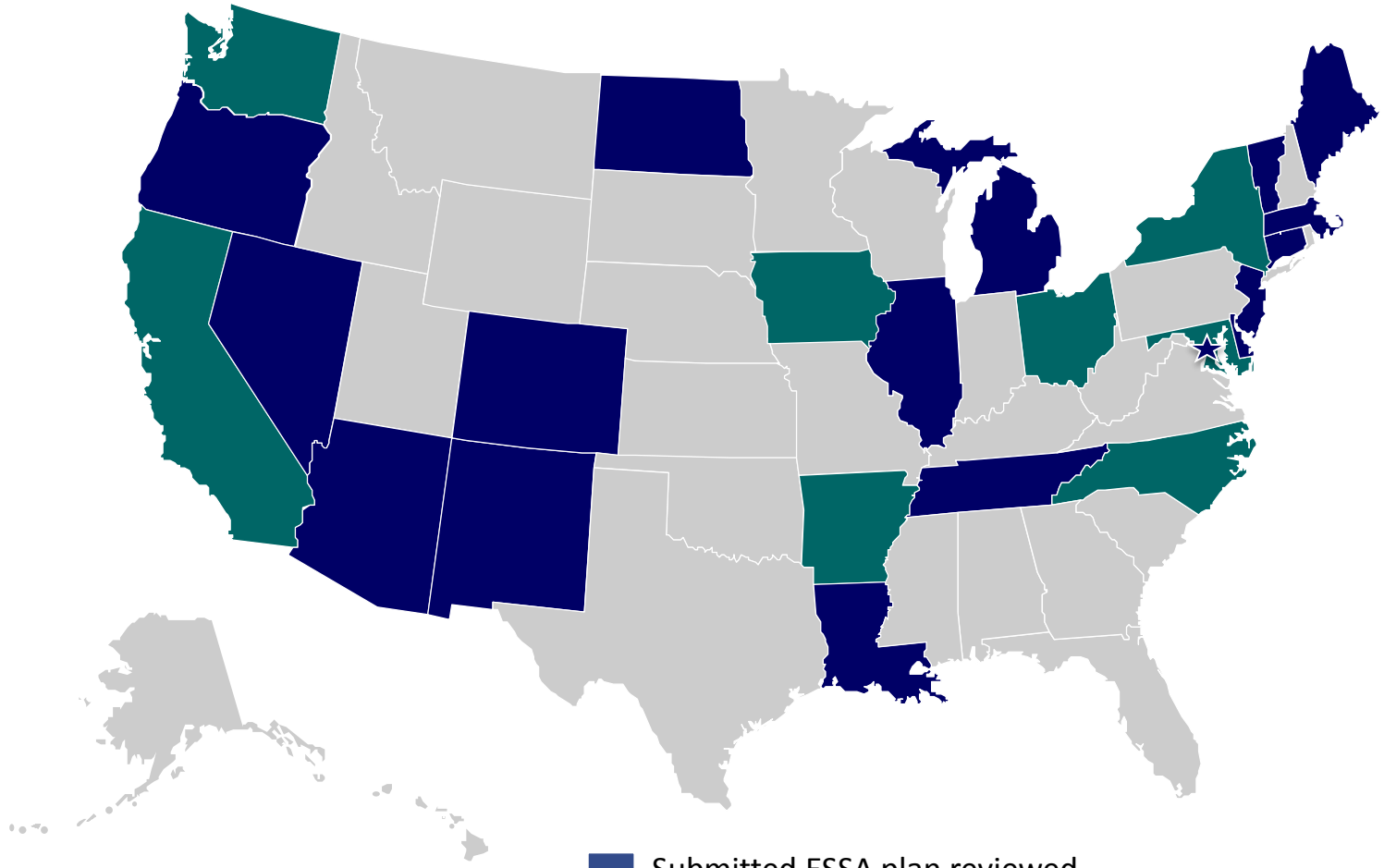
Supporting Research
We found examples of these policies in action at the state level, as well as organizations supporting them

*Note: Achieve's recent report *Leveraging ESSA to Promote Science and STEM Education in States* provides a valuable complement to this analysis.

State Education Agencies (SEAs) are required to submit ESSA plans to the U.S. Department of Education (USED) in one of two rounds. This analysis examines plans submitted in round one and selected draft plans for round two



We reviewed 25 ESSA plans in draft form or submitted to USED between April 3-June 26 for STEM mentions and innovations



Submitted Plans Reviewed

Arizona
Colorado
Connecticut
D.C.
Delaware
Illinois
Louisiana
Maine
Massachusetts
Michigan
Nevada
New Jersey
New Mexico
North Dakota
Oregon
Tennessee
Vermont

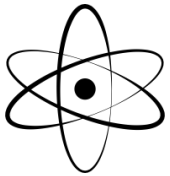
Draft Plans Reviewed

Arkansas
California
Iowa
Maryland
New York
North Carolina
Ohio
Washington

Note: We selected draft plans to review based on recommendations from STEM experts.

3| Findings

We found four high-impact policies that trended throughout the plans. We will examine each one, describing how states can make the most of them. It is worth noting that ESSA plans do not necessarily include all of a state's STEM initiatives



Inclusion of State Science Assessment in Accountability System

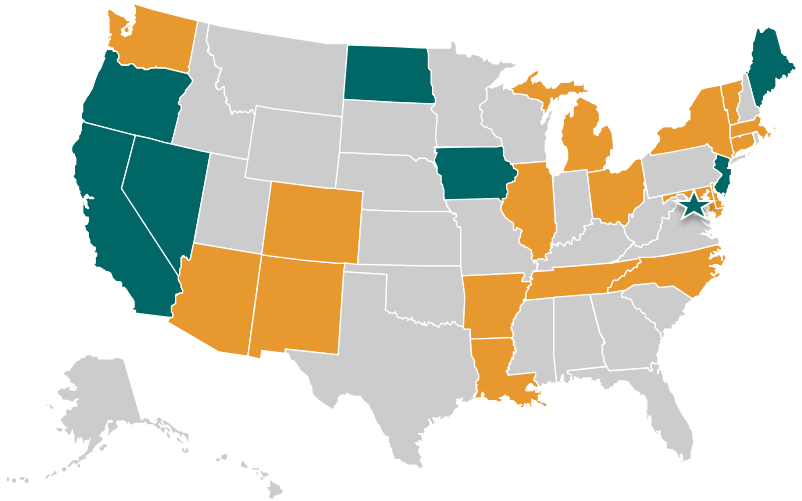
Inclusion of Advanced Placement (AP)/International Baccalaureate (IB) Indicators in Accountability System

Inclusion of Career and Technical Education (CTE) Indicators in Accountability System

STEM Elements in 21st Century Community Learning Centers

Seventeen states included or are strongly considering including performance on state science assessments in their accountability systems

Inclusion of State Science Assessment in Accountability System



State ESSA plan includes science in accountability system or includes a timeline for doing so in the future

State ESSA plan does not include science in accountability system

Not included in this analysis

To promote student success, states can:

- Ensure sufficient instructional time, particularly at the elementary level
- Use data from the accountability system to support equity by directing resources (including teachers) where they are most needed
- Plan to use all available resources—including out-of-school time, partnerships and grant opportunities—to address science achievement

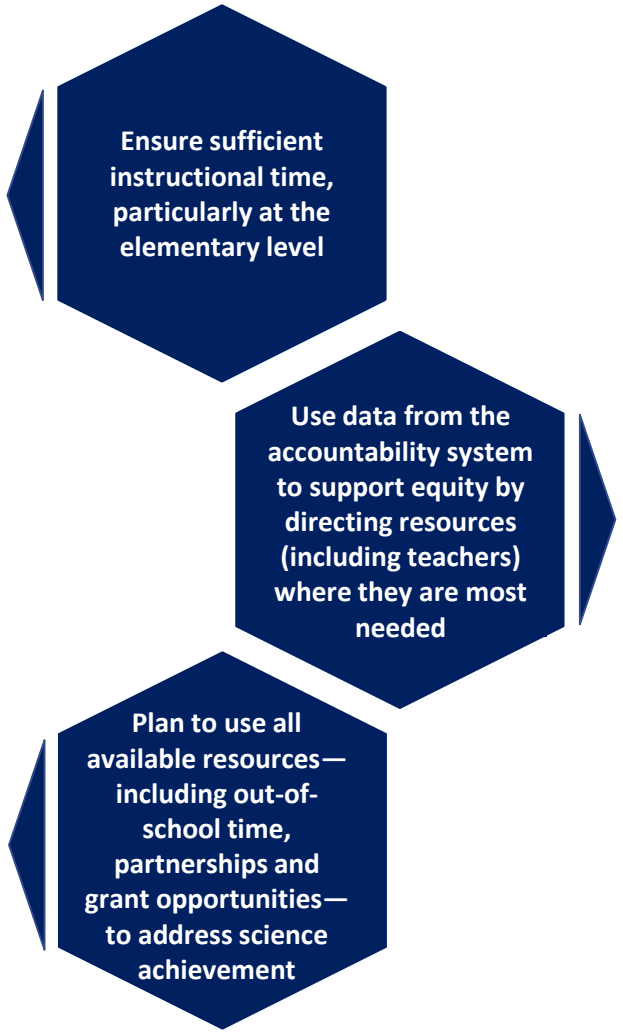
Example language: Connecticut: **"**Indicator 1 - Academic Achievement: Performance indices ranging from 0 to 100 for English language arts (ELA), mathematics, and science are produced by transforming scale scores from the state summative assessments into an index." (page 34)

Promising practices: How can states prioritize instructional time, use data to foster equity and take advantage of all available resources?

Inclusion of State Science Assessment in Accountability System

- Most U.S. fourth-graders **spend fewer than three hours a week on science**—and one in five don't even get two hours.
- Students who have more time are more likely to do hands-on activities and practice inquiry skills—the kind of experiences that are shown to **spark lifelong interest in science.**
- **About 66% of fourth-graders in Texas,** which includes science in school accountability ratings, had teachers who said they spent at least three hours a week on science. In Oregon, which does not include science in school accountability, only 23% of fourth-graders had that experience.

- Aligned, research-based STEM programming **both inside and outside of school** has been shown to **improve academic achievement.**

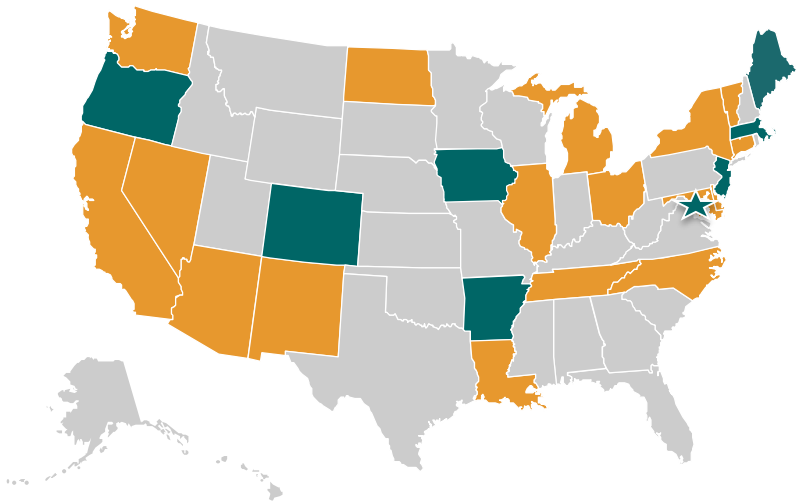


- States should encourage districts to **identify at-risk students and provide them with additional resources** through either school funding or a categorical grant.
- States should **define effective science teaching and track and publicly report the distribution of highly effective science teachers** across districts or statewide, consistent with privacy regulations.

Sources: Change the Equation, http://changetheequation.org/will-elementary-science-remain-forgotten-stepchild-school-reform; Out-of-School Time Resource Center, http://ostrc.org/stem/documents/Afterschool-AVitalPartnerinSTEMEducation.pdf; Education Commission of the States, http://www.ecs.org/ec-content/uploads/Equity_in_Education_Key_questions_to_consider.pdf

Seventeen states included or are strongly considering including CTE indicators in their accountability systems

Inclusion of CTE Indicators in Accountability System



State ESSA plan includes CTE indicators in accountability system or includes a timeline for doing so in the future*

State ESSA plan does not include CTE indicators in accountability system

Not included in this analysis

*States measured this by access to coursework, completing coursework or a defined pathway, or acquiring an industry credential.

To promote student success, states can:

- Link CTE coursework to college- and career-ready standards
- Provide career counseling for CTE students
- Align and coordinate with industry to create a workforce pipeline for in-demand jobs
- Use multiple measures for college- and career-readiness indicators, and disaggregate data for each measure
- Provide access to high-quality career pathways—not merely CTE courses

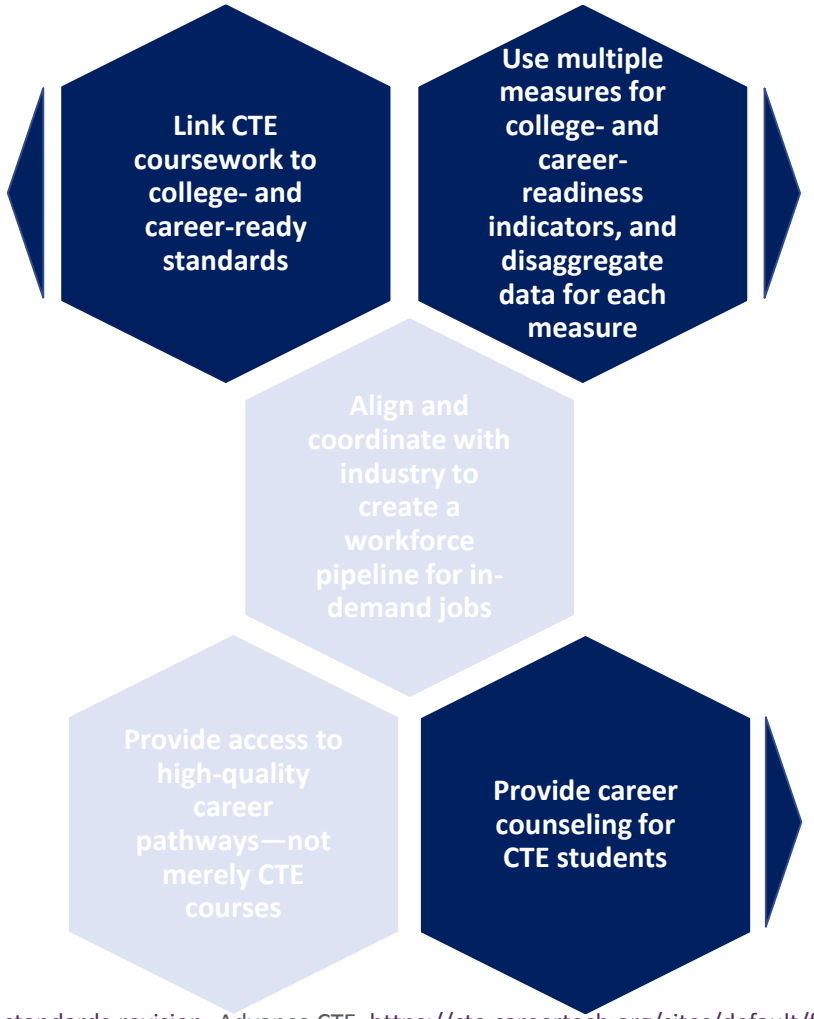
Example language: Nevada***: "***The college and career readiness indicators for high schools consist of five measures:. . . Secondary Pathways Options (including AP/IB/Dual Credit and industry-aligned and state board-approved CTE credentials). . ." (page 28)

Something to watch: In feedback to states to date, USED has asked for clarity on how states will include CTE and other college- and career-readiness measures as accountability indicators. Read more in Education Week.

Promising practices: How can states link CTE to strong standards, measure college and career readiness in multiple ways and provide career counseling?

Inclusion of CTE Indicators in Accountability System

- From 2012-2015, **Tennessee completely revamped its CTE programming** to be aligned with the state's K-12 standards. As described by Advance CTE, courses are now:
  - Part of programs of study including at least three courses
  - Aligned with postsecondary courses and the demands of entry-level jobs in the field
  - Rigorous and with clear expectations, providing opportunities for teachers to introduce project-based instruction
  - Focused on developing skills necessary for employment, such as critical thinking, problem-solving and teamwork



- There is no single foolproof measure for college and career readiness, **so states should use multiple measures**. They should be sure to disaggregate all data at the school level to inform decision-making.
- Advance CTE recommends measures such as performance on state assessments, graduation, dual enrollment credits and postsecondary degree or certificate attainment.

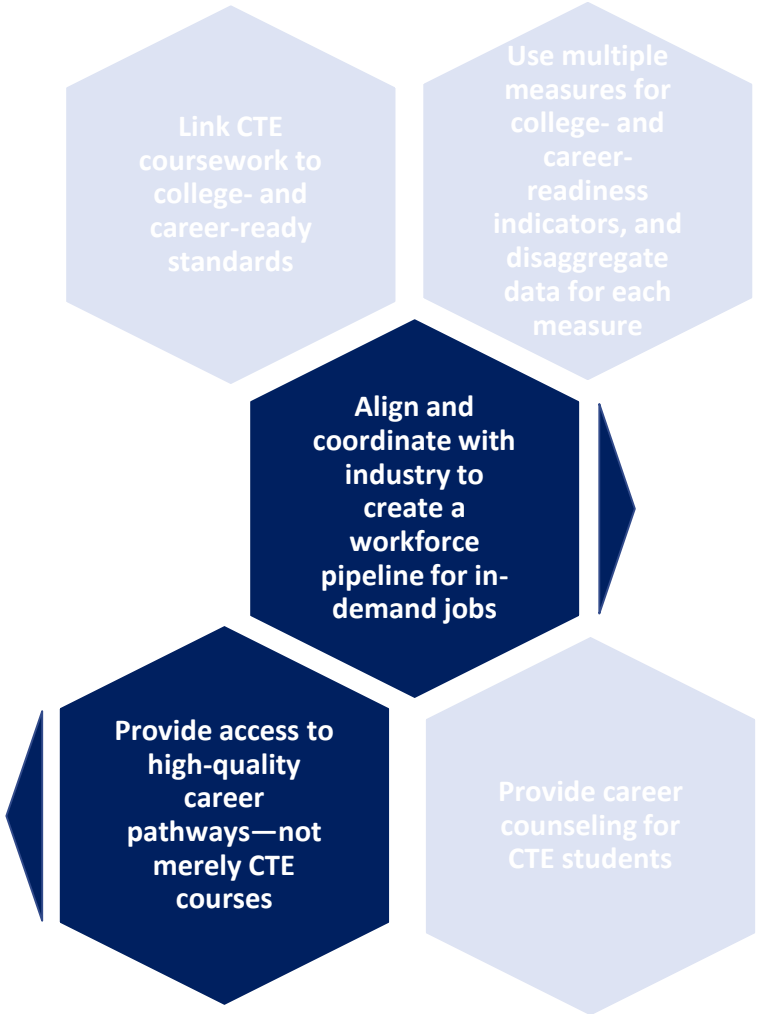
- Students need guidance when selecting their CTE programs **in order to put them on track for careers**. Students in Arkansas are required to take six units of "career focus" coursework in consultation with their guidance counselor.

Sources: Advance CTE, https://careertech.org/resource/tennessee-standards-revision; Advance CTE, https://cte.careertech.org/sites/default/files/files/resources/Destination_Known_College_And_Career_Readiness_2017.pdf; Thomas B. Fordham Institute, http://edex.s3-us-west-2.amazonaws.com/publication/pdfs/(2016.04.07)%20Career%20and%20Technical%20Education%20in%20High%20School.pdf

Promising practices: How can states work with local industry to create real career pathways and give students access to in-demand jobs?

Inclusion of CTE Indicators in Accountability System

- A career pathway is a "**sequence of learning experiences** that span secondary and postsecondary systems, blend rigorous core academic and career technical instruction, offer focused career guidance and advisement systems, include high-quality work-based learning experiences, and **culminate in postsecondary or industry credentials** of value."
- In New Jersey, locally developed CTE programs **face rigorous review from the state Department of Education**. Among other requirements, programs must demonstrate a labor market need, establish admission requirements that include equity and access for all populations, establish relevant postsecondary linkages and establish processes for program evaluation.

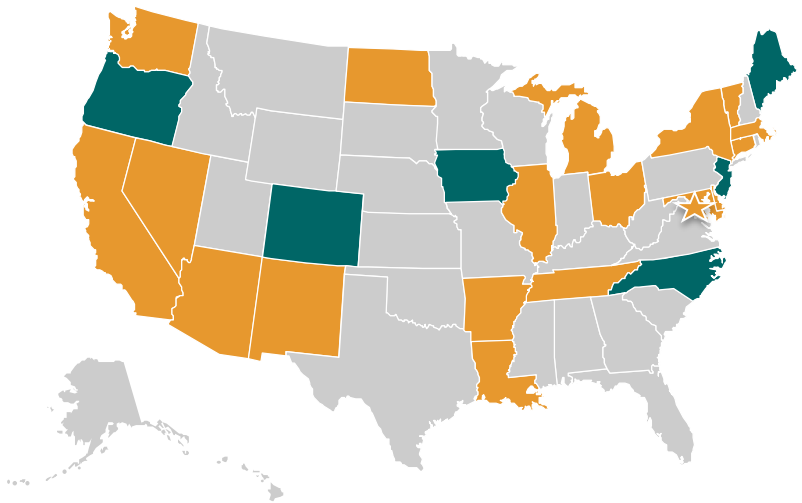


- Tennessee's Career Clusters program directly connects CTE programming with high-wage growth occupations in the state. This **provides strong career opportunities** for students who most need it.
- NAF connects educators, businesses and community leaders to **transform the high school experience** with the goal of addressing problems facing education and the economy.
- In Fayette County, Pennsylvania, Chevron has **created a K-12 Fabrication Lab** to help build student skills and interest in high-demand STEM careers.

Sources: Advance CTE, https://cte.careertech.org/sites/default/files/files/resources/Raising_the_Bar_Pathways_Approval_2017_0.pdf; Advance CTE, https://www.careertech.org/resource/cte-equation-in-Tennessee; NAF, http://naf.org/about; imaginepittsburgh.com, http://explore.imaginepittsburgh.com/now/fablabiu1110415/31258/

Nineteen states included or are strongly considering including Advanced Placement/International Baccalaureate indicators in their accountability systems

Inclusion of AP/IB Indicators in Accountability System



- State ESSA plan includes AP/IB indicators in accountability system or includes a timeline for doing so in the future*
- State ESSA plan does not include AP/IB indicators in accountability system
- Not included in this analysis

To promote student success, states can:

- Create and support AP/IB pipelines for both teachers and students
- Use targeted communication to parents and students to encourage participation in AP/IB courses
- Use data strategically to ensure resources are going to schools and students who most need support

Example language: Michigan**:** "The 11-12 Advanced Coursework indicator uses a 100-point index. This measure is the percentage of 11-12 grade students successfully completing advanced coursework (Dual Enrollment, Early Middle College, CTE, AP, and IB)." (page 28)

Something to watch: In feedback to states to date, USED has asked for clarity on how states will include AP/IB and other college- and career-readiness measures as accountability indicators. Read more in Education Week.

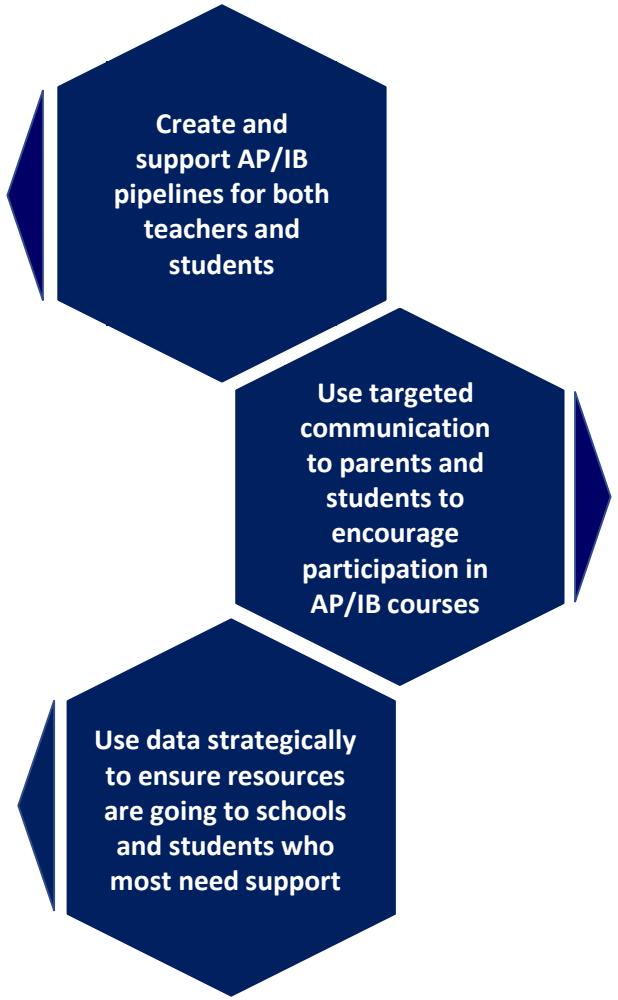
*States measured this by course access, course completion, exam taking or exam performance.

Promising practices: How can states create student and teacher pipelines, communicate with families and use data strategically to promote advanced coursework?

Inclusion of AP/IB Indicators in Accountability System

- The National Math and Science Initiative's College Readiness Program provides **a coordinated strategy** to advance teachers, students and schools toward AP/IB success.
- 100Kin10 works with academic institutions, government agencies, nonprofits and other organizations to **recruit and retain effective STEM educators.**
- Equal Opportunity Schools partners with high schools to identify students who are qualified for AP/IB courses but are not taking them.

- **The College Board's** "District Leadership Playbook: Expanding Access to Advanced Placement for Students of Color" provides **strategies and tools to push for equity** in AP course access and performance.

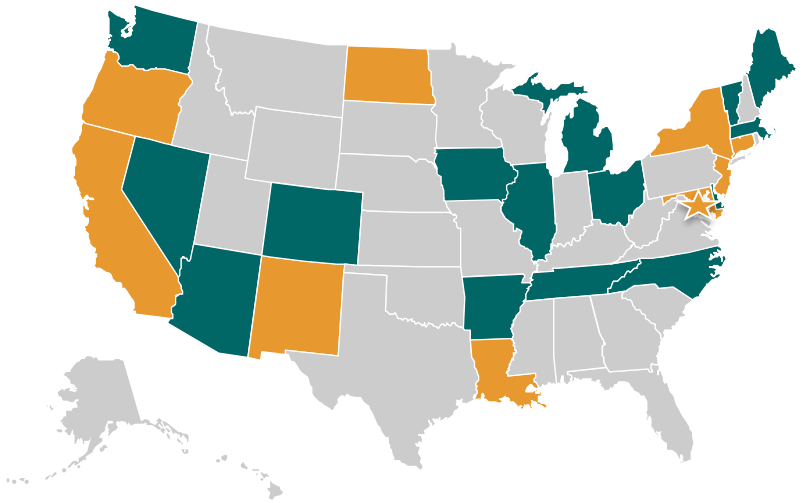


- The College Board has a set of **useful communications materials** for parents and students.
- In part due to this strategy, Evanston Township High School in Evanston, Illinois increased the number of students who earned a "3" or higher on AP exams for **white students by 31 percent, black students by 98 percent and Latino students by 116 percent.**

Sources: National Math and Science Initiative, https://www.nms.org/Our-Approach/CRP.aspx; 100Kin10, https://100kin10.org/partners; Equal Opportunity Schools, http://www.eoschools.org; The College Board, http://www.niu.edu/ilhstocollege/resources/speed-up1/CollegeBoard.APDistrictLeadershipPlaybook.March2015.pdf; The College Board, http://apcentral.collegeboard.com/apc/public/start_grow_ap/share_promote_ap/index.html; NPR, http://www.pbs.org/newshour/bb/illinois-high-school-shrinks-achievement-gap-minority-students-setting-high-bar/

Ten states are requiring or encouraging STEM activities in their 21st Century Community Learning Centers grants (21st CCLC)

STEM Elements in 21st Century Community Learning Centers



State ESSA plan includes STEM elements in 21st Century Community Learning Centers*

State ESSA plan does not include STEM elements beyond the ESSA statute in 21st Century Community Learning Centers

Not included in this analysis

* States articulated this in various ways. See Slide 27.

To promote student success, states can:

- Align 21st CCLC curriculum with K-12 standards without redundancy
- Create programming that is hands-on and active, like experiments and trips to museums
- Focus on equity by exposing students to new experiences and content
- Engage parents to drive interest

Example language: Louisiana: **"**Furthermore, priority [for 21st CCLC applicants] is also given to those that propose a program focusing on Science, Technology, Engineering, Arts and Math (STEAM) and those that target 'D' and 'F' rated schools." (page 104)

Promising practices: How can states and districts provide high-quality, standards-based programming supported by strategic partnerships?

STEM Elements in 21st Century Community Learning Centers

- While 21st CCLC programming should be distinguishable from daily classroom lessons, it still should **align with K-12 standards** and supplement daily instruction. The STEMworks rubric from Change the Equation concisely defines this best practice.

- Parents support STEM in 21st CCLCs and other afterschool programs. About 65% of parents agree that afterschool programs **can help children gain interest and skills related to STEM.** More than half of parents said that STEM learning opportunities were very important in their decision to pick their program.

Align 21st CCLC curriculum with K-12 standards without redundancy

Create programming that is hands-on and active, like experiments and trips to museums

Engage parents to drive interest

Focus on equity by exposing students to new experiences and content.

- Hands-on activities that encourage experimentation are more engaging for students **and can encourage lifelong interest in STEM**. For instance, NASA has created programming for 21st CCLCs.

- Informal education experiences, such as afterschool programs, have the potential to increase student achievement and drive interest in STEM. **But access to high-quality STEM programming is inconsistent, especially in low-income communities.** States should target resources so students have opportunities that they are unlikely to receive elsewhere.

Sources: Change the Equation, http://changetheequation.org/sites/default/files/CTEqDesignPrinciplesRubric.pdf; Afterschool Alliance, http://afterschoolalliance.org/documents/AA3PM-2014/AA3PM_National_Report.pdf; NASA, https://www.nasa.gov/offices/education/seap-abstracts-21CCLC.html; Afterschool Alliance, http://www.afterschoolalliance.org/ExaminingtheImpactofAfterschoolSTEMPrograms.pdf

States included STEM in their 21st CCLC plans in a variety of ways, some more prescriptive than others. These states included requirements above what ESSA already allows

State	STEM 21st CCLC Mention in ESSA plan
California	STEM Power of Discovery cited as a potential TA provider (page 3)
Connecticut	"Foster[ing] digital learning" is a listed goal (page 73)
D.C.	Providers that "implement STEM programs to inspire and encourage students, by engaging them in hands-on, experiential, inquiry-based and learner-centered activities, including engineering design processes" are given additional "points" in their application (page 62)
Louisiana	"Furthermore, priority is also given to those that propose a program focusing on Science, Technology, Engineering, Arts and Math (STEAM) and those that target 'D' and 'F' rated schools." (page 104)
Maryland	Providers earn additional "points" for "proposing a program whose focus is science, technology, engineering and mathematics (STEM) including all seven State STEM standards of practice." (page 60)
New Jersey	"… NJDOE requires 21st Century Community Learning Centers grantees to focus on one of the following themes: STEM …" (the plan lists three other areas) (page 141)
New Mexico	"The STEM focus, and in some instances a STEAM focus (Science, Technology, Engineering, Arts and Math), is an element of every funded 21st CCLC grantee." (page 145)
New York	"Specific State-level activities currently underway that will continue include: … STEM/STEAM professional development and other resources are made available to 21st CCLC sub-grantees via the (Technical Assistance Resource Centers, or TARCs) and/or the website that the Centers maintain. The bi-annual professional development events coordinated by the TARCs include STEM and/or STEAM-themed offerings for sub-grantees." (page 137)
North Dakota	"North Dakota 21st CCLC programing helps in the continuous improvement process by providing children below, at and above the poverty line access to quality out-of-school programing. This programing provides students a safe, nurturing environment and an education anchored in a STEAM curriculum." (page 110)
Oregon	"Applications will be based on a local Comprehensive Needs Assessment, encourage connections and alignment between other Title programs, Career and Technical Education (CTE) opportunities, and STEM initiatives …" (the plan lists two other areas) (page 128)

Our analysis found fewer similarities in how states planned to use Title II and Title IV dollars for STEM. Title II proposals largely fund improvement of skills and recruitment

Examples of STEM in Title II (not comprehensive)		
Purpose of Title II (in statute) *	**State**	**STEM-related proposal**
1. Increase student achievement consistent with the challenging state academic standards 2. Improve the quality and effectiveness of teachers, principals, and other school leaders 3. Increase the number of teachers, principals, and other school leaders who are effective in improving student academic achievement in schools 4. Provide low-income and minority students greater access to effective teachers, principals, and other school leaders *Note: These purpose statements come directly from the ESSA statute. For more detailed ideas of how Title II can be used for STEM, see the previously mentioned NSTA report and Achieve report, and USED's own guidance.*	Louisiana	"… teacher preparation providers will be rewarded for placing yearlong teaching residents in rural and high-need schools, and in high-need subject areas." *Note: These high-need subject areas presumably include STEM subjects.* (page 71)
	Nevada	Nevada "will use the 4% of Title II, Part A funds allowable for statewide activities to improve the preparation, recruitment, evaluation, development, and retention of effective educators. Funds will be prioritized to focus on strategies in the following areas: … Recruitment for Hard to Staff/Shortage Areas …" *Note: These hard-to-staff subject areas presumably include STEM subjects.* (page 41)
	New Jersey	The state will "design, implement and evaluate a comprehensive, ongoing, job-embedded and data-driven professional development plan that focuses on digital literacy ... the plan will include current applications to assist students' understanding of the nature and impact of STEM, computational thinking, coding and technological design and how they relate to individuals, global society and the environment." (page 93)
	New York	"Department regulations also provide for specific pedagogical coursework requirements for accredited teacher preparation programs … Among these requirements are pedagogical coursework requirements that include … (vi) uses of technology, including instructional and assistive technology, in teaching and learning—and skill in using technology and teaching students to use technology to acquire information, communicate, and enhance learning." (page 121)
	North Carolina	The state has created regionally based cohorts to train local leadership teams on the North Carolina Digital Learning Competencies for Classroom Teachers and School Administrators; there also are regional sessions for classroom teachers. (page 95)

Our analysis found fewer similarities in how states planned to use Title II and Title IV dollars for STEM (cont'd). Title IV, Part A can address STEM instruction and professional learning

Examples of STEM in Title IV, Part A (not comprehensive)		
Purpose of Title IV, Part A (in statute) *	**State**	**STEM-related proposal**
1. Provide all students with access to a well-rounded education 2. Improve school conditions for student learning 3. Improve the use of technology in order to improve the academic achievement and digital literacy of all students	Colorado	"Colorado will use funds to support LEAs regarding evidence-based practices to support LEAs in the effective use of technology to improve the academic achievement and digital literacy of all students." (page 99)
	Illinois	Illinois "is considering using Title IV, Part A dollars to support LEAs in offering all students, through the Illinois Virtual School, direct access to standards-aligned courses for high school students, including AP and credit-recovery options." (page 126)
	Maryland	Maryland will "support LEAs in providing programs and activities that improve access and opportunity," such as "strategies to encourage and provide access to integrated STEM core concepts and practices for all students, specifically for female and students of color." (page 57)
	Michigan	Michigan listed numerous STEM opportunities for Title IV, Part A, including "Professional development for STEM, including coding and game design," "Professional development on how to embed STEM (engineering design principles, computational thinking, app design) in other content areas," and "Providing programming to improve instruction and student engagement in STEM, including computer science, and increasing access to these subjects for underrepresented groups." (page 84)
	North Dakota	"Through ESSA, North Dakota schools will be encouraged to incorporate STEM and STEAM learning strategies, competency-based learning programs, and project-based learning frameworks." North Dakota will "support districts that develop a comprehensive, innovative learning plan that demonstrates innovative practices and increases rigorous learning for students." *Note: North Dakota will use part of its Title IV, Part A funding to support districts with guidance and tools.* (page 96)

Note: These purpose statements come directly from the ESSA statute. For more detailed ideas of how Title IV can be used for STEM, see the previously mentioned NSTA report and Achieve report, and USED's own guidance.

Beyond the four common policy areas, some states' plans contained STEM proposals that are worth watching

Iowa

- *STEM Advisory Council is identifying high-quality STEM professional development (page 60)*
- *Certified higher education partners will conduct the training for teachers across the state (page 60)*

New Mexico

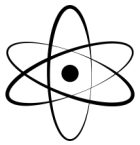
- *Professional Learning Communities (PLCs) of STEM educators will use technology to help teachers in small, rural schools meet to discuss research in order to successfully replicate evidence-based practices (page 123)*
- *The state will create a new STEM readiness indicator in accountability that includes not just performance on science assessments, but student engagement in STEM (page 70)*

Washington

- *Washington will establish statewide computer science standards (page 143)*
- *The state will expand Career and Technical Education and STEM opportunities through partnerships with Microsoft, Boeing and other companies (page 120)*

4| Conclusion

Recap: Some of the most common proposals in ESSA plans provide opportunities for states to improve STEM education while promoting equity, if they are strategic



Inclusion of State Science Assessment in Accountability System

- Ensure sufficient instructional time, particularly at the elementary level
- Use data from the accountability system to support equity by directing resources (including teachers) where they are most needed
- Plan to use all available resources—including out-of-school time, partnerships and grant opportunities—to address science achievement

Inclusion of CTE Indicators in Accountability System

- Link CTE coursework to college- and career-ready standards
- Provide career counseling for CTE students
- Align and coordinate with industry to create a workforce pipeline for in-demand jobs
- Use multiple measures for college- and career-readiness indicators, and disaggregate data for each measure
- Provide access to high-quality career pathways—not merely CTE courses

Inclusion of AP/IB Indicators in Accountability System

- Create and support AP/IB pipelines for both teachers and students
- Use targeted communication to parents and students to encourage participation in AP/IB courses
- Use data strategically to ensure resources are going to schools and students who most need support

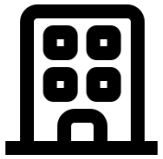
STEM Elements in 21st Century Community Learning Centers

- Align 21st CCLC curriculum with K-12 standards without redundancy
- Create programming that is hands-on and active, like experiments and trips to museums
- Focus on equity by exposing students to new experiences and content
- Engage parents to drive interest

To promote student success, states can:

Above all, states, districts and advocates should think creatively in using ESSA dollars to support STEM

1. **Think outside of the four walls of the classroom or the traditional school day.** ESSA funding can be used for out-of-school time, partnerships, professional development for partners and other supports.



2. **Be driven by your equity data.** Where are students getting access to STEM courses, materials and programs? Which students are not? What can you learn from including science in your accountability system?

3. **Seize the low-hanging fruit**. For example, invite partners to Title II-funded professional development that covers STEM, or consider linking to STEM in your 21st CCLC applications (e.g., giving more points for STEM-themed proposals).

4. **Partner with outside organizations to maximize dollars and bring in more STEM resources**. Reach out to local industry about working together on CTE courses and pathways. Contact museums, zoos, universities and other organizations to see if they are interested in supplementing STEM programming.

Thank you! For more information, visit:

www.education-first.com/library
@ed1stconsulting

5 | Appendix

What you'll find in this Appendix:

Acknowledgments p. 36

State-by-State Table of Analyzed Policies p. 37

Links to State ESSA Plans p. 38

Education First ESSA Publications p. 39

We thank the following individuals and organizations for providing invaluable interviews, guidance and advice

- **100Kin10:** Grace Doramus
- **Advance CTE:** Austin Estes, Kate Kreamer
- **Afterschool Alliance**: Erik Peterson, Jen Rinehart, Stephanie Rodriguez
- **Change the Equation:** Linda Rosen, Claus von Zastrow
- **Education Commission of the States**: Matt Jordan, Julie Rowland Woods
- **Overdeck Family Foundation**: Brian Carter
- **STEM Education Coalition**: James Brown, Lindsey Gardner
- **Washington STEM**: Jesse Gilliam, Caroline King

Below is a state-by-state breakdown of major STEM proposals in the ESSA plans we reviewed

State	Science in Accountability	CTE in Accountability	AP/IB in Accountability	STEM prioritized or required in 21st CCLCs	STEM mentioned in 21st CCLCs
Arizona	X	X	X		
Arkansas	X		X		
California		X	X		X
Colorado	X				
Connecticut	X	X	X		X
D.C.			X	X	
Delaware	X	X	X		
Illinois	X	X	X		
Iowa					
Louisiana	X	X	X	X	
Maine					
Maryland	X	X	X	X	
Massachusetts	X		X		

State	Science in Accountability	CTE in Accountability	AP/IB in Accountability	STEM prioritized or required in 21st CCLCs	STEM mentioned in 21st CCLCs
Michigan	X	X	X		
Nevada		X	X		
New Jersey				X	
New Mexico	X	X	X	X	
New York	X	X	X		X
North Carolina	X	X			
North Dakota		X	X		X
Ohio	X	X	X		
Oregon					X
Tennessee	X	X	X		
Vermont	X	X	X		
Washington	X	X	X		

Source(s): ESSA State Plan Submissions

Below are links to the ESSA plans we reviewed

State	ESSA Plan
Arizona	Submitted Draft, 4/3/17
Arkansas	Draft, 5/22/17
California	Draft, 5/22/17
Colorado	Submitted Draft, 5/9/17
Connecticut	Submitted Draft, 4/3/17
D.C.	Submitted Draft, 5/2/17
Delaware	Updated Submitted Draft, 6/29/17
Illinois	Updated Submitted Draft, 5/2/17
Iowa	Draft, 6/16/17
Louisiana	Submitted Draft, 4/15/17
Maine	Submitted Draft, 3/31/17
Maryland	Draft, 6/27/17
Massachusetts	Updated Submitted Draft, 5/10/17

State	ESSA Plan
Michigan	Updated Submitted Draft, 5/23/17
Nevada	Submitted Draft, 4/3/17
New Jersey	Updated Submitted Draft, 5/3/17
New Mexico	Submitted Draft, 4/3/17
New York	Draft, 5/8/17
North Carolina	Draft, 6/26/17
North Dakota	Updated Submitted Draft, 5/1/17
Ohio	Draft, May-June 2017
Oregon	Submitted Draft, 5/1/17
Tennessee	Submitted Draft, 4/3/17
Vermont	Updated Submitted Draft, 5/3/17
Washington	Draft, 11/13/16

We've also created a number of ESSA resources for policymakers, advocates and other stakeholders. Here are a few for your reference

"Investing in Title II-A: Strengthening School and Teacher Leadership"	This resource is designed to help state policymakers, district leaders, advocates and funders make the most of ESSA Title II-A funding to strengthen school and teacher leadership. We reviewed 28 draft ESSA plans to create this resource that highlights the trends across plans, features examples of innovative states and includes strategies and resources for states. It can be downloaded here.
"Let's Get This Conversation Started"	This publication provides strategies, tools, examples and resources to help states engage with stakeholders to develop and implement their ESSA plans. It can be downloaded here.
"Choices and Trade-offs"	The Every Student Succeeds Act gives states the flexibility to decide how to measure student success in high school. This guide is designed to elevate the trade-offs between using state- or nationally-developed assessments. The guide proposes a series of issues policymakers should investigate to determine which approach best matches state priorities. It can be downloaded here.
"Making the Most of the Every Student Succeeds Act"	This is a reference guide (and our advice) for states, districts, advocates and funders to advance state goals under ESSA. It can be downloaded here.