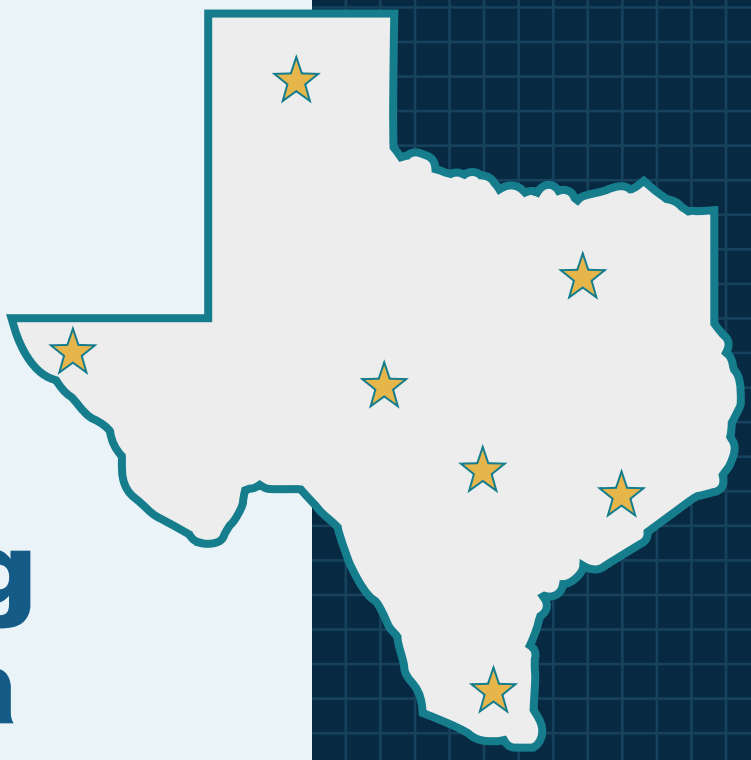
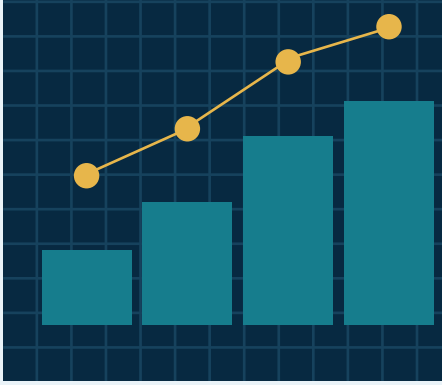
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Advancing K–12 Data Science Education

Recommendations of the Data Science 4 Texas Task Force



DS4TX
DATA SCIENCE FOR TEXAS

Lead Authors and DS4TX Chairs

Marc T. Sager, Ph.D., *Southern Methodist University*

James Newland, Ph.D., *University of Texas at Austin*

Elaine Anita De Melo Gomes Soares, M.S., *University of Texas at Austin*

DS4TX Regional Leadership Team

Kenneth Carrell, Ph.D.
Angelo State University

Mariam Manuel, Ph.D.
Sam Houston State University

Angela Chapman, Ph.D.
University of Texas at Rio Grande Valley

Audrey Meador, Ph.D.
West Texas A&M University

Taylor Darwin, Ph.D.
Tarleton State University

Robyn Pinilla, Ph.D.
University of Texas at El Paso

Contributors

Carol Fletcher, Stephanie Baker, Yiwen Yang, Miriam Jacobson
Texas Advanced Computing Center

Kate Miller
Concord Consortium

Sean Sukol, Lee Ellen Harmer
Data Science 4 Everyone

Kristin Hunter-Thomson
Dataspire

Corey Rogers
Micro:bit

Jocelyn Foran
Tuva

Additional Contributors

Sergio Arjon, Samantha Bertrand, Brianna Bustillos, Julie Butler, Renee Cosby, Stormy Daniels, Annababette Diemecke, David Hale, Natasha Holden, Cristina Jimenez, Kadron Johnson, Ashley Lozano, Leigh Ann Mitchell, Jennifer Simmons, Alana Trammell, Beatrize Valenzuela, Devina Varela, Karla Velarde, Jacob Waggoner, Tamika Williams, and Karen Wright-Balbier.

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Executive Summary

The Challenge

Data science now underpins nearly every major Texas industry. Nationally, data science employment is projected to grow 34% between 2024 and 2034, and the Texas Workforce Commission has identified preparing students for high-skill, in-demand jobs as a strategic priority. Yet Texas currently ranks in the lowest tier nationally for data science implementation, with fewer than 3,000 students (less than 0.05%) able to access standalone data science courses or integrated modules. Professional development for educators falls far short of demand, and access that does exist skews toward affluent, urban districts.

The DS4TX Task Force

In response, DS4TX formed in 2025 out of the national data science education movement, with support from Data Science 4 Everyone, the Texas Advanced Computing Center, and WeTeach_CS. The goal of DS4TX is to make data science and data literacy an integrated part of K-12 education in Texas by 2030. In June 2026, the Task Force convened 51 teachers in San Antonio, comprised of administrators, researchers, and policy representatives from six regions in Texas. Working groups on classroom integration, professional learning, and policy assessed the current landscape, conducted SWOT analyses, and developed recommendations.

Key Findings

1. **Texas already has a foundation.** Data literacy appears in the Texas Essential Knowledge and Skills (TEKS), carries a formal State Board of Education (SBOE) definition, and is supported by Texas Education Agency (TEA) guidance. Teachers often teach data skills without naming them as such. The SBOE, TEA, Education Service Centers (ESCs), and district pipeline already exist to deliver policy and training.
2. **The field lacks shared definition and ownership.** Data science has no common definition across disciplines and no clear institutional home, which fragments advocacy and weakens proposals to decision-makers.
3. **Teachers face real barriers.** Heavy workloads, tool anxiety, competition for class time, and little data literacy preparation in educator preparation programs limit adoption.
4. **Accountability shapes priorities.** Because data science is not separately tested, it is often deprioritized, a pattern participants described as “not tested, not taught.”
5. **Near-term windows are open but closing.** The math TEKS revision offers a brief opportunity to embed data literacy language before the next cycle, roughly five years away.

Recommendations

1. **Engage the math TEKS revision now** and pursue similar language in the upcoming ELA/ELAR revision.
2. **Establish a shared definition** grounded in TEA and SBOE language, supported by a glossary, educator one-pager, and analysis showing where data science already appears in state assessments.
3. **Co-construct TEKS-aligned lesson modules** with teachers and data experts, housed in a public repository and supported by a year-long learning community.
4. **Build stackable microcredentials** progressing from spreadsheet tools to coding and machine learning, scaled through a train-the-trainer model using ESCs.
5. **Use Career and Technical Education as the near-term pathway**, integrating data science into existing CTE courses such as Scientific Research and Design, with an Industry-Based Certification as a longer-term goal.
6. **Break down silos and expand the coalition**, especially to educator preparation programs and rural educators through virtual participation.

The Cost of Inaction

Without coordinated action, Texas will fall further behind other states, employers will absorb training that K-12 could provide more efficiently, existing state investments will remain underused, access gaps will widen, and the goodwill built through DS4TX will fade. By working within existing systems and acting on time-sensitive opportunities, Texas can lead the nation in preparing data-literate students for the careers and civic life of tomorrow.

1. Introduction

Data science education (DSE) aims to equip students with the analytical tools and critical thinking necessary to navigate the complexities of contemporary data-driven environments, fostering a new generation of professionals capable of leveraging data to derive insights and solve complex problems across various industries (Jiang et al., 2022; Jones & Rosenberg, 2022; National Academy of Sciences, Engineering, and Medicine [NASEM], 2023, 2026; Rosenberg et al., 2020). At the K-12 level, DSE is especially important as an entry point for developing these capacities before students reach higher education or the workforce. K-12 DSE frameworks emphasize not just technical skill-building but conceptual understanding, including the ability to reason critically about what data can and cannot tell us.

The need to support the development of a data-ready workforce for Texas is clear. Schools are one major way to help build a workforce ready to use data science and data literacy to power the Texas economy. The Texas Workforce Commission (TWC) strategic goals for 2025-2029 describe how to "prepare a skilled workforce to fill critical jobs in the future" by "supporting educational programs for students in Texas that inform and prepare them for high-skill, in-demand jobs and career success" (TWC, 2024).

The academic literature and TWC describe a need for rigorous K-12 DSE driven by two critical imperatives. First, data competencies are no longer treated as niche technical skills but are in demand across industries and required for participation in a broad range of careers and civic contexts (The Burning Glass Institute, 2023; The White House, 2026; U.S. Department of Labor, 2026). Second, the proliferation of data-driven tools in everyday life demands that all young people develop the capacity to reason critically about data, algorithmic systems, and technological tools, not only as future workers, but as informed participants in civic and social life (European Commission & OECD, 2025). Nationally, data science employment is projected to grow 34% from 2024 to 2034 (U.S. Bureau of Labor Statistics, 2024), making early exposure to data reasoning and AI literacy not only educationally meaningful but also economically consequential for the youth we serve. Across Texas, nearly every industry now relies on data in some form, and the students sitting in our K-12 classrooms today will enter a workforce shaped by that reality (Gold, 2024). Learning to work with data helps young Texans make sense of large and varied information drawn from many sources and turn it into insights that support thoughtful, well-informed decisions, whether in a boardroom, a clinic, a farm field, or their own communities (Dykema, 2024).

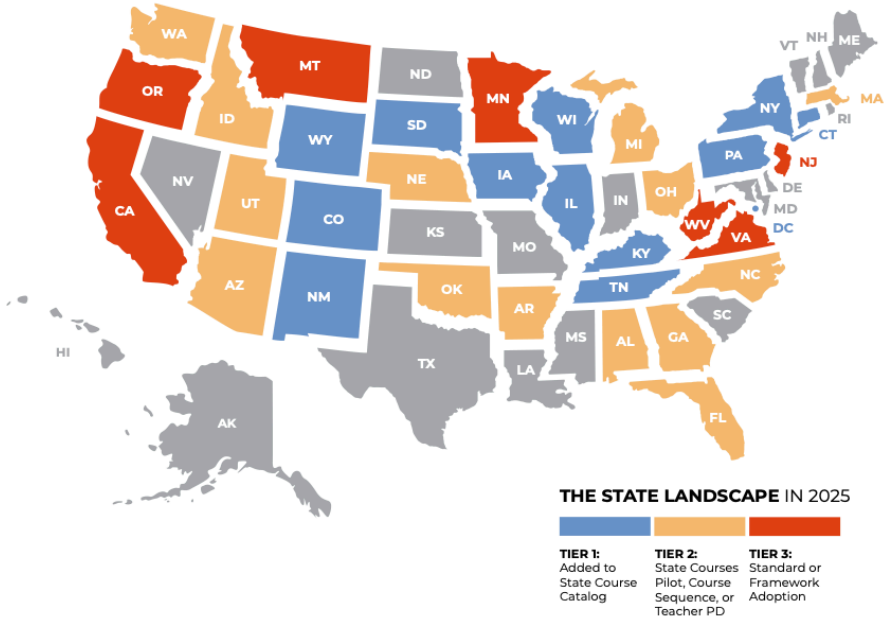
Data science already plays a central role in the industries that drive the Texas economy. Energy companies use it to manage production and plan for the future, while agricultural producers rely on it to monitor crops, weather, and markets. Data Science supports patient care and medical research in Texas hospitals and health systems, powers work in aerospace, engineering, and the

growing tech sector, and informs decisions in finance, insurance, and state and local government. These are only a few examples, since data skills are valuable across a wide range of fields and organizations throughout the state. For Texas students, building these skills in K-12 opens doors well beyond any single career path (Matthews, 2024). Students who can work with data are better prepared to understand the people and communities around them, spot patterns and identify problems worth solving, and respond thoughtfully to real needs (Groth, 2026). Students learn to ask questions, weigh evidence, and use what they find to guide action and measure results. These skills for interpretation and decision-making can be used to enact change on both local and global scales. Bringing data science into Texas classrooms ensures that students across the state, in urban, suburban, and rural districts alike, are ready to participate in the economy and civic life of Texas.

As of 2025, the state of Texas is currently behind other states in terms of data science implementation, currently at a tiered rank of "None" (see Figure 1; Sukol, 2025). Some recent data shows that only a few students, numbering less than 3,000 (less than 0.05%; Texas Tribune, n.d.), have access to standalone data science courses or data science modules integrated into other coursework in Texas (Sukol, 2025). And more telling, the number of professional development (PD) programs offered to Texas educators falls far short of meeting the needs laid out by the education community and the TWC. Creating a community of practice centered on delivering PD as well as constructing new data-centric pedagogy is imperative.

Figure 1

Data Science Implementation in the U.S.



Note. Reprinted from Sukol (2025). Grey indicates a tiered rank of "None," meaning there is currently no statewide initiatives for the integration of data science or data literacy.

2. Background

2.1 Key Definitions

The following definitions establish the terminology used throughout this white paper and are drawn from, or aligned with, existing Texas Education Agency (TEA) language where possible.

Data Science is understood as a combination of machine learning, quantitative methods, and educational technology. Characteristics of data science include the use of large-scale data sets to capture details about individuals, their behavior, and their place in the shared world (NASEM, 2026). Data is treated here as inherently interdisciplinary, encompassing both qualitative and quantitative information. Data science can be used in context through integration into existing coursework or as a stand-alone course in its own right. Put simply, data science is asking questions that are best answered using statistical thinking and computing tools to interrogate data.

Data Science Education (DSE) aims to equip students with the analytical tools and critical thinking skills necessary to navigate the complexities of contemporary data-driven environments, preparing a new generation of professionals capable of leveraging data to derive insights and solve complex problems across industries (NASEM, 2023, 2026).

Data Literacy is the ability to interpret, understand, analyze, and communicate with data. Beyond numbers, statistics, and charts, data literacy includes evaluating and drawing meaningful insight from data, allowing individuals to make informed decisions, solve complex problems, and communicate their findings effectively (TEA, n.d.; Bargagliotti et al., 2020).

Data Storytelling is the practice of turning data into a compelling narrative supported by visualizations, with the goal of producing some kind of change. Creating data stories requires understanding the audience so that the claims made by the author are clearly understood to achieve the desired change (Data Science 4 Everyone [DS4E], 2025; Wilkerson & Laina, 2018).

2.2 Research Foundations

DSE is grounded in a broader body of research from mathematics and science education, learning sciences, and data modeling, drawing on the foundational work of scholars such as Drs. Richard Lehrer, Leona Schauble, Anthony Petrosino, Andee Rubin, Joe Polman, and many others.

Two frameworks in particular inform the approach taken in this work. The Data Investigation Process (DIP) described by Lee and colleagues (2022) offers a model considered especially well suited and detailed for DSE specifically, while the GAISE II framework (Bargagliotti et al., 2020) establishes data literacy as a guiding principle for statistics and data

education more broadly. In practice, the DIP with six phases is more suited to a long-term research project or a stand-alone data science course. The GAISE II framework describes the statistical problem-solving process in four components and is likely more useful for adding data science into an existing course curriculum.

These frameworks align closely with TEA's own recommendations for integrating data literacy within STEM instruction, which emphasize six interconnected principles. Critical thinking and problem-solving call for the critical evaluation of data sources and the ability to distinguish reliable from misleading information, often through real-world problems that require analysis, prediction, and proposed solutions. Authentic learning engages students in scientific investigation or engineering design projects requiring the collection, analysis, and interpretation of real-world data. An interdisciplinary approach encourages students to integrate knowledge across STEM disciplines to address problems that naturally span multiple fields. Technology integration incorporates data visualization tools, spreadsheets, and statistical software to support hands-on analysis. Cross-disciplinary activities showcase how data literacy applies across subject areas, reinforcing collaboration between STEM disciplines. Finally, ethical considerations engage students in examining the privacy, bias, and ethical responsibilities associated with data handling (TEA, n.d.).

2.3 The National Landscape of Data Science Education

DS4TX's work is situated within a broader national movement to expand K-12 DSE. DS4E is a coalition advancing DSE so that every K-12 student is equipped with the data literacy skills needed to succeed in the modern world, framing equal access to DSE as a pathway to higher education, high-paying careers, and civic engagement (DS4E, n.d.).

The Data Science national momentum has been reflected in both public discourse and formal policy advocacy. A Freakonomics podcast episode explored how K-12 data literacy can better prepare students for the modern economy (DS4E, n.d.), while DS4E convened more than 60 academics, policymakers, educators, and industry partners for a leadership summit at Stanford Graduate School of Education focused on how and why to expand K-12 DSE. That same coalition later gathered more than 160 signatures from experts and leaders on a letter to President Biden recommending specific actions to prioritize DSE nationally.

While this national coalition-building work established the case for DSE broadly, DS4E's reach as a national organization can only extend so far into any single state's specific policy and classroom realities. Recognizing this, DS4E has increasingly focused on empowering state-level coalitions to carry this work forward locally, a shift that would ultimately provide the foundation and support DS4TX needed to begin its own work in Texas.

2.4 Formation of the DSE Community and the K-12 DSE Conference

The national DSE community took a more formal shape in 2023. Through the work of DS4E, the Concord Consortium, and numerous other collaborators, a formal DSE community coalesced at the 2023 American Educational Research Association conference in Chicago. Following a symposium connected to the 2023 NASEM proceedings, a dedicated gathering was hosted at the University of Chicago to continue building this coalition.

That meeting led directly to conversations about establishing a research-to-practice K-12 DSE conference. Planning for the inaugural conference began later that year, with a formal call for planning committee members issued in the fall of 2023. One of DS4TX's founding coalition leaders was selected to serve on that planning committee, a role that included monthly planning meetings and a two-day in-person planning session at the Gates Foundation offices in Washington, D.C., as the conference was built from the ground up.

The inaugural biannual conference was held in San Antonio, Texas, in February 2025, drawing approximately 300 researchers, curriculum developers, and practitioners.

2.5 From National Momentum to DS4TX

The inaugural conference was intentionally designed around "homerooms," small groups that brought contributors together across roles and regions to spark exactly this kind of connection. It was within one of these homerooms that the first listed author (MTS), serving as a "homeroom teacher," took the lead in guiding a conversation about the state of DSE in Texas, drawing out perspectives from the group and beginning to sketch what a coordinated Texas effort might look like. Marc met Jimmy, a fellow Texan and fellow advocate for the integration of DSE, in that same homeroom, and Jimmy left the conversation energized, urging the group to keep the momentum going rather than let the conversation end when the conference did. During that same conference, DS4E announced a call for applications to support statewide DSE convenings, giving Marc and Jimmy's continued conversation a concrete next step to work toward.

Texas has historically presented a distinct organizing challenge given its size and demographic diversity, spanning urban and rural communities across vastly different regions. Marc and Jimmy led an application on Texas's behalf, but with 45 states applying for only three available funding slots, the application was not ultimately selected. Several of the states chosen were further along in coordinating a unified statewide DSE presence, reflecting the scale of the organizing task still ahead in Texas.

Despite this outcome, DS4E recognized the value of the work already underway in Texas, work that had begun with Marc's willingness to start that conversation in the first place, and provided direct capacity support to help sustain the coalition's momentum. This support proved to be the catalyst that led to the formal establishment of DS4TX, setting the stage for the Task Force structure described in the following section.

3. The DS4TX Task Force

3.1 Formation

The DS4TX Task Force emerged from early collaboration between DS4E and a small group of Texas-based organizers, including Jimmy, Marc, Elaine, and DS4E representatives Corey Rogers and Lee Ellen Harmer, who began brainstorming what a statewide coalition for DSE might look like. The effort quickly gained institutional backing, receiving financial and organizational support from the WeTeach_CS program at The University of Texas at Austin's Texas Advanced Computing Center (TACC). WeTeach_CS (WTCS) is the professional development arm of the Expanding Pathways in Computing (EPIC) directorate within TACC supported by state funding through the Texas CS Pipeline, among other sources.

To ensure the coalition reflected the geographic and regional diversity of Texas, the state was divided into six regions: North Texas, the Panhandle, Southeast Texas, Central/West Texas, Far West Texas, and the Rio Grande Valley. Faculty and researchers from each region were recruited to serve as regional leaders. These regional leaders played a central role not only in shaping the design of the Task Force convening itself but also in recruiting the participants who would ultimately take part in it.

3.2 Mission and Vision

The DS4TX Task Force is guided by a single, unifying goal: to catalyze the adoption of data science and data literacy as an integrated component of K-12 education in Texas by 2030.

3.3 The Task Force Convening

The DS4TX Task Force convening was held in June 2026 in San Antonio, Texas, in conjunction with the annual WTCS Summit. With support from the Regional Leadership Team, the convening drew approximately 50 participants spanning K-12 classroom teachers, instructional coaches, district administrators, researchers, policymakers, and DSE content providers. The convening was designed around three goals: assessing the current state of DSE across Texas, building relationships across sectors, and beginning collaborative action planning.

The convening unfolded over a day and a half. The first day opened with a welcome and mission overview, followed by a keynote from Dr. Carol Fletcher of TACC. Participants then took part in mixed-sector table introductions intended to surface the current state of DSE across the state. From there, the group divided into three topic-focused breakout rooms, *classroom* i*ntegration and pedagogy*, *professional learning and support systems,* and *policy, leadership and systems change*, to map where data science currently stands, identify existing resources and champions, and surface remaining gaps. Findings from each breakout were reported back to the whole group to build a shared statewide picture, and the day concluded with a visioning exercise in which the same three topic groups articulated what successful data science integration would look like by 2030.

The second day shifted the group's focus from vision to action. Following a brief reflection on the prior day's insights, the same working groups conducted a strength, weakness, opportunity and threat (SWOT) analysis within their respective topic areas. These findings were then used to brainstorm concrete strategies, near-term actions, necessary resources, and potential owners for moving the work forward. Groups reported their prioritized recommendations during a working lunch, and the convening closed with a discussion of how to sustain engagement going forward, including regional networks, working groups, and recurring meetings, alongside a call for individual and organizational commitments. Across the two days, participants moved from establishing a shared understanding of the current landscape to producing concrete, prioritized recommendations intended to inform this white paper and guide statewide action toward the 2030 integration goal.

Throughout the convening, discussion was structured using a three-part mechanism, moving from broad to specific and from open analysis toward the development of clear themes and recommendations. The ultimate goal was to create a set of actionable items towards the vision of the coalition.

3.4 Convening Topics

The convening's three breakout topics were designed to capture distinct but interrelated dimensions of the work required to reach the 2030 goal.

- **Topic 1: Classroom Integration and Pedagogy** examined how data literacy can be woven into existing curriculum and what teachers need to make that possible.
- **Topic 2: Professional Learning and Support Systems** examined how educators can be prepared and supported and what infrastructure is needed to sustain that support.

- **Topic 3: Policy, Leadership, and Systems Change** examined what policy shifts or leadership actions would enable this work and how it could be scaled statewide.

3.5 Participants

The convening drew 51 participants representing a broad cross-section of sectors involved with DSE in Texas. Both higher education institutions (IHE) and classroom teachers represented the largest groups, with 14 participants each. Administrators accounted for 11 attendees, and content-area specialists contributed six. The remaining participants included six individuals in other roles, two representatives from Education Service Centers (ESC), two pre-service teachers, one DS4E policy representative, and one state-level education administrative representative serving in an observational role, reflecting an initial but present pipeline of future educators in the conversation.

Among the teacher participants, representation spanned grade bands and organizational levels: 12 identified as secondary teachers, eight as elementary teachers, and five as district-wide staff. This mix ensured that discussions of classroom integration, professional learning, and policy were grounded in perspectives spanning the full K-12 continuum, rather than concentrated within a single grade band or role.

4. Topic Group Findings

The participants worked on structured documents during the roundtable discussions, which focused on several tasks. Those tasks consisted of describing the current landscape in Texas for K-12 data literacy and data science, mapping topics and determining themes brought forward by participants, building a vision for the data skills we want to see being in taught in K-12 by the year 2030, performing a SWOT analysis based on the previous discussions; and setting action strategies for each group of participants moving forward in both the short and long term. The resulting analysis derived from the work of each group exists both separately and as a part of the wide range of issues and needs of DSE efforts in the state. Rather than presenting each stage separately, this section synthesizes that process into a single set of findings, which the working groups identified as the clearest lens for translating into actionable recommendations.

4.1 Classroom Integration

The classroom integration group consisted of several in-service, pre-service teachers, education researchers, and a few DSE content providers. The in-service educator contingent spanned K-12 grade levels, all four core subjects, and electives, including a librarian.

4.1.1 Strengths: Existing Content and Supporting Entities

These data science educators described how data literacy, specifically, is already embedded in the technology applications Texas Essential Knowledge and Skills (TEKS) and how these topics were tested on the standardized tests, including state assessments as well as national exams. One important point drawn out during discussions among the participants was the existence of and support from national organizations and special interest groups in creating or centering K-12 DSE. Some of these groups are the DS4E, NASEM, the National Council for the Social Studies, the National Council of Teachers of Mathematics, the National Science Teachers Association, and the Computer Science Teachers Association, among others.

Also, the state has at least one currently recognized data science course titled *Elements of Data Science* listed in the mathematics section as an innovative course, although the status and reach of the course were both discussed. The Skew the Script nonprofit organization, centered in San Antonio, was also mentioned as an existing resource in the state for DSE for those teaching statistics and related subjects.

The classroom integration subgroup participants also stated that nascent efforts to build transdisciplinary pedagogy through DSE count as a strength, although it is important to build beyond the enthusiastic core group in attendance into a broad coalition of educators.

4.1.2 Weaknesses: Acknowledging the Silo Effect

The lack of a unified advocacy message across organizations is considered a major weakness. The ways in which data science and data literacy show up and are discussed vary currently across grade levels and certainly between disciplines. The role of state and national standards suggesting the integration of data science and data literacy also looks very different in STEM courses than it does in humanities courses, and this is framed as a weakness.

The discussion of how data science and data literacy look different in different courses and contexts highlights an important point drawn out in the discussions about acknowledging that one discipline cannot be allowed to take ownership of DSE efforts. The idea that data science may belong only in math or computer science is seen as a weakness for widespread adoption. The notion was brought up repeatedly that data science and data literacy skills belong in all subjects and should to be seen as transdisciplinary.

Educators find that efforts to integrate data science, computer science, and information literacy cause a sense of competition for class time alongside the traditional curriculum in any given course. The lack of adequate time to integrate data science and data literacy is also impacted

by veteran teachers not wanting to integrate new pedagogy and also pre-service teachers not receiving training on integrating data science and data literacy pedagogical techniques.

4.1.3 Opportunities: Using Existing Tools and Resources

Since the state TEKS documents impact all educators, efforts to introduce language or incremental changes in the standards language can impact all courses at the same time. Although the cycle of revising the standards is both staggered and at a low cadence, additions to the language of the introduction sections need not wait for a full revision to appear before action can be taken. An inspection of existing standards shows that many courses already have data science and data literacy adjacent language. These existing, but less obvious, standards can be made into an opportunity with some minor adjustment to terminology used in the opening sections not requiring a full revision cycle to be altered.

Other states also have models or at least components of implementation of data science and data literacy integration that can inform the work in our own state. The advocacy of DS4E and similar groups allows our own efforts to bring data science into classrooms to not be done in isolation. Finding common challenges across statewide efforts for data science classroom integration means we join a community of other states from whom we can learn. The lessons we learn can also then be shared with states that need support implementing similar DSE initiatives.

4.1.4 Threats: Fragmentation of Integration Efforts

The threats voiced by the classroom integration subgroup focused on local classrooms. One important issue to address is the current political landscape around data centers and accessible education efforts. Attendees shared that effort needs to be made to create data science and data literacy education as distinct from but related to computer science, especially in understanding the underlying behavior of machine learning algorithms and the training of models. Also, the rights and responsibilities of individuals in terms of their own data are important potential threats to consider.

Another threat participants brought forward is the concern that DSE be labeled as extra or separate from core subjects like English, math, science, and social studies. Some educators shared that examining existing state and national exam test items that focus on data science and data literacy might help mitigate the fracturing or fragmentation of integration efforts, but that also state and national assessments in core subjects can be seen as a threat.

Lastly, the classroom integration subgroup described a threat to the initiative at hand as one of latency or stagnation. The energy and excitement of the convening must necessarily be

converted into the slow and steady work of addressing the various concerns and sharing the workload of making the initiative to integrate data science and data literacy into action.

4.2 Professional Learning

The professional learning group brought together a cohort of in-service educators, preservice teachers, higher education faculty, instructional coaches, and educational researchers. The K-12 educator group spanned primary through postsecondary levels, including STEM, CTE, Social Studies and elementary teachers.

4.2.1 Strengths: Strong Pedagogical Foundations and Existing Statewide Structure

This group of data science advocates established an understanding of what high-quality professional learning means. Successful professional development must honor educator agency, treat teachers as active learners, provide extended engagement over time rather than isolated one-off workshops, and offer compensation for teachers' time.

Building upon these pedagogical foundations, Texas benefits from a statewide infrastructure of 20 regional Educational Service Centers (ESCs) and proven professional development scaling models such as the WeTeach_CS Texas Computer Science Pipeline initiative. These existing networks offer established connections for curriculum dissemination and leadership development without the need to build new systems from scratch.

In addition to this institutional framework, data literacy and fluency concepts are already present within current Texas standards, including K-8 *Technology Application* TEKS, career and technology education (CTE) courses, and many K-12 core classes. Teachers are frequently facilitating data-focused learning activities without explicitly labeling them as data science, similarly described in the classroom integration group.

4.2.2 Weaknesses: Teacher Workload and Structural Gaps

K-12 Educators are constantly being asked more of them while still having to keep up with their daily tasks leading to low morale and an increased sense of fatigue. Any professional learning initiative can be viewed as an additional task thus facing acceptance resistance.

This constraint is compounded by technology acceptance and tool anxiety, particularly among elementary grades and non-STEM educators who express apprehension surrounding technical tools and programming languages. Simply learning basic software navigation is extremely different from using software for authentic data inquiry. Participants shared that this

gap creates significant frustration during training, requiring language and concepts that begin simple to meet teachers where they are.

Beyond classroom-level friction, systemic teacher pipeline fractures persist within higher education and state governance. Educator Preparation Programs (EPPs) at universities rarely integrate data literacy into content-related courses, shifting the responsibility to in-service training programs. Additionally, data science lacks a unified institutional definition across Texas K-12, leaving professional development efforts scattered across individual disciplines.

4.2.3 Opportunities: Integration, Expert Support, and Technology Fluency

One of the suggestions that quickly grew popular in the group was integrating data science concepts directly into existing core subject-area professional development in math, science, social studies, and technology applications rather than creating standalone courses. To operationalize this approach, DS4TX can facilitate the creation of an open-access repository housing TEKS-aligned lesson modules co-constructed by classroom teachers and peer-reviewed by experts, enabling non-specialist educators to implement data science activities without any additional preparation burden.

Complementing these classroom modules, asynchronous online micro-credential pathways offer a flexible mechanism for continuous teacher upskilling. By establishing clear skill progressions that transition from graphical user interfaces and spreadsheet tools like Excel and CODAP to computer programming, teachers can earn credentials tied to district incentives. Furthermore, pairing content-area teachers with technical data experts within local communities of practice provides sustained classroom coaching that significantly lowers technical friction during lesson execution.

These internal strategies are further reinforced by external policy momentum and high-quality instructional materials. The current policy and funding interest in advanced technology serves as a powerful tailwind, which frames data literacy as an essential precursor to responsible technology fluency can unlock new professional development support.

4.2.4 Threats: Accountability Pressures and Funding Fragilities

One of the most pressing threats is the “not tested, not taught” reality of state accountability. Because data science is not currently evaluated as a standalone assessed subject on state and national standardized tests, administrators and teachers naturally prioritize test content over non-tested data literacy initiatives.

Simultaneously, public school districts face tightening operational budgets, declining student enrollments, and potential reductions in federal Title II professional development funds, all of which threaten the long-term financial sustainability of non-mandated teacher training.

Finally, rapidly shifting educational technology trends risk "buzzword burnout" among educators and decisionmakers. If data science is perceived as a fleeting trend, an *Ed Tech* push, or a politically contentious topic regarding data privacy, it further risks losing critical grassroots and policy support for professional development efforts across the state.

4.3 Policy and Leadership

The policy and leadership group brought together education researchers, school and district-level administrators, secondary science and mathematics educators, representatives from regional service centers, a state-level agency representative, and a DSE policy expert.

4.3.1 Strengths: Existing Infrastructure and Momentum

Data science already has a meaningful foothold within Texas's existing educational infrastructure. Relevant concepts, language, and learning strands already exist within the TEKS, including within science process standards and technology applications, and data literacy carries a formal SBOE definition supported by published TEA guidance. The state's organizational chain, from SBOE to TEA to ESCs to districts and classrooms, already exists as a functioning pathway for rolling out both policy and professional development, meaning new infrastructure would not need to be built from scratch.

Beyond formal structures, real resources and expertise already exist to build upon. Open educational resources related to data science are available. An academic research base already supports data science instruction across content areas and grade levels, and existing TEKS documentation provides a starting foundation. Working relationships already established within TEA and ESCs, along with individuals in district leadership positions who bring direct implementation experience, represent practical assets for moving initiatives forward.

Finally, external workforce demands add credibility to this work. Growing interest from higher education and broader industry partnerships in data science provides validation from outside the education system itself, meeting the states' priorities to develop future and career-ready students.

4.3.2 Weaknesses: Gaps in Definition and Ownership

The most consistently cited weakness is the absence of a shared definition and explicit naming convention. There is no common understanding across fields and organizations of what data science actually is, and even where the underlying concepts already exist within the TEKS. Teachers are not explicitly naming or emphasizing the data science connection, leaving both teachers and students unaware that the connection exists.

Closely related is the absence of clear ownership and a cohesive implementation strategy. Data science currently has too many potential institutional homes, spanning math, CTE, and science, and no entity has clearly claimed ownership of the work. As a result, there is no cohesive plan addressing where data science instruction should live, what it should look like in practice, or who is ultimately responsible for teaching it. To this end, policy efforts remain too undefined to bring a concrete, actionable proposal to decisionmakers.

Buy-in and alignment of data science remain inconsistent as well. Local buy-in varies considerably by district, with no consistent mechanism for engaging district leaders. Alignment across K-12, higher education, workforce, and accountability systems remains unclear, risking fragmented or even contradictory efforts across well-intentioned collaborators. Similar to the aforementioned groups, because data science content is largely untested, securing campus and district buy-in is inherently more difficult than for tested subjects.

These gaps are reinforced by underlying structural limitations. Texas public schools currently lack dedicated, explicit data science courses. The evidence documenting the actual instructional impact of DSE remains shallow. Even basic data on program availability is limited, making it difficult to advocate persuasively to policymakers and leaders.

4.3.3 Opportunities: Windows for Near-Term Action

Several timing-specific policy windows offer near-term opportunities. The K-12 math TEKS revision, open for a window of roughly three months, provides a near-term chance to embed data literacy language before the next multi-year revision cycle closes, and SBOE has already directed workgroups to include data strands within science, math, social studies, and technology applications TEKS, providing an existing foothold. Shifting public sentiment, such as the move from four statewide standardized exams to three per year, may also create space to reframe what gets tested and how.

Course and credentialing pathways present a second category of opportunity. A dedicated data science Industry-Based Certification (IBC) could be developed, potentially aligned with

agriculture, business, engineering, health science, and *information technology* career pathways, on a rough timeline of drafting in 2026 and 2027, phasing in during 2027, and going live by 2028. Additionally, a standalone data science course could be introduced through CTE as a capstone, elective, or research and design course, avoiding the substantially harder path of creating an entirely new mandated course. Participants also pointed to the recent addition of Occupational Safety and Health Administration standards as a useful policy precedent for the kind of strand-naming approach being proposed here, and noted longer-term interest in exploring a College Board AP Data Science course.

Training and scaling models offer a third avenue. STEM Leads at ESCs could be trained through a train-the-trainer model to help districts analyze state and national standardized test items where data-related performance can be improved. The WeTeach_CS Launch K-5 model was cited as a useful template for developing structured, ready-to-use instructional materials. Online professional development was floated as a scalable, lower-cost delivery method, and WTCS was identified as a potential partner in funding teacher training, shaping standards language, and building buy-in by breaking down standardized test data for districts.

Aligned data science messaging and statewide evidence-building represent a fourth opportunity area. SBOE could be asked to explicitly name data strands for each new or revised course across K-12, paired with clearly defined professional development models. Mapping data science content directly to standardized test items could support a white paper or publication demonstrating where data science already exists within current assessments. One insight consistent with the working group's broader observation was that data is often "surrounded but hidden in plain sight" within instruction that already occurs. Developing a validated data science assessment instrument, similar to the Force Concept Inventory used in physics education, could further strengthen the evidence base.

4.3.4 Threats: Risks to Sustained Progress

Framing and rollout choices shape how well data science is received. Introducing coding and non-coding approaches together lets teachers see the full breadth of the field from the start and connect it to the expertise they already bring. Grounding the work in its own terms keeps it well aligned with current state-level guidance. While public perception of computer science education can spark interest in data science, a well-articulated rationale for why this work matters helps data science secure its place among the many priorities schools are balancing.

Clarifying governance and ownership of data science is a key threat. Data science already has champions across math, CTE, science, and other disciplinary departments. Naming a lead entity, or a shared structure that draws on each of their strengths, would help coordinate

implementation and keep momentum going. Early data science adopters bring deep classroom and community expertise, building stronger, more consistent trust between them, the TEA, and the SBOE, which would help the working group's recommendations gain traction. Involving all relevant parties in policy decisions from the start builds shared ownership and sets the stage for strong, lasting implementation.

Resource and curricular adoption considerations round out the threat landscape, and each points to a place where policy can make implementation easier. Districts and ESCs know their own capacity best, so policies that offer flexible and scalable implementation options that align funding with organizations' needs to create sustainable infrastructure. Teachers and school leaders bring valuable perspectives on change. Policy structures that include them in early design and pilot phases turn their questions into insight that strengthens adoption.

Funding and policy conditions are constantly shifting, which raises challenges with district planning. Enrollment growth allows for phased implementation, which assists districts in intentionally allocating resources. Further, because training and rollout must fit within already full school calendars, policy can support efficient, embedded professional learning that works within existing structures and serves any implementation pathway ultimately chosen.

4.4 Synthesizing Cross-Group Findings

Several structural realities shape how any of the above opportunities can realistically be pursued, and are worth stating explicitly rather than leaving implicit within the analyses above. Authority for major structural change rests specifically with SBOE, not TEA. Any new standalone course or formal TEKS revision must proceed through SBOE's approval process, and participants noted that SBOE's current appetite for entirely new, "innovative" course proposals is limited. This means the working group's recommended emphasis on working within existing course structures, such as capstones, practicums, or CTE electives, is not merely a matter of preference but a reflection of where change can realistically occur in the near term.

Responsibility for implementation, by contrast, is distributed across multiple levels of the system, each with distinct contributors. At the district level, teachers, administrators, counselors, curriculum leads, and students all require direct engagement, with counselors in particular needing clarity on what a CTE-style data science course would mean for students. From perspectives of the IHEs, academic advisors, admissions counselors, and the design of introductory coursework all matter, along with clearer alignment between K-12 and higher education beyond dual credit alone. Considering the role of regional entities, ESCs are positioned as a key structural partner, though detailed participant mapping at this level remains an area for further work. At the state

level, SBOE, the Higher Education Coordinating Board, and TEA would need to coordinate directly with one another, alongside engagement from employers and industry.

Finally, timing constraints intersect with all of the above. Both the math and ELA/ELAR TEKS are scheduled for review before 2030, creating a specific and time-limited opportunity to embed data literacy language, comparable to how financial literacy language was previously added when those standards were last reopened. DS4TX is not itself a legislative advocacy organization, but it is well positioned to produce a foundational framework or recommendation document for SBOE's consideration. Because the state legislative session is approaching, any policy ask that depends on new legislation, such as a newly required course, would need to be raised imminently to have a realistic chance of inclusion, and high school remains a notable gap in current efforts, since prior statewide work has concentrated primarily on K-8 technology applications TEKS.

5. Recommendations and Next Steps

The following six recommendations integrate the priorities identified across the working groups. Together they reflect a shared strategy: build on the standards, course structures, and regional networks Texas already has rather than creating new systems, give teachers low-barrier entry points that respect their time and expertise, and develop the shared language and evidence base that make sustained coordination possible. The recommendations are ordered by urgency and dependency, beginning with the time-sensitive opportunity presented by the upcoming TEKS revision and moving toward longer-term investments in professional learning, CTE pathways, and coalition growth.

Recommendation 1: Engage the Math TEKS Revision While the Window Is Open

The most time-sensitive action is for DS4TX to submit formal input during the upcoming revision of the K-12 math TEKS. This window is expected to stay open for only a few months and will not recur for several years, so it should be the coalition's immediate priority. DS4TX should prepare a concise framework or best-practices document for the SBOE, with the explicit goal of preserving and strengthening data-related process standards and should submit public comment at every available reading and comment opportunity. Because the ELA/ELAR TEKS are also scheduled for review before 2030, DS4TX should pursue embedding data literacy language there as well, as financial literacy language was added when those standards were last reopened. This submission should draw on the shared definition described in Recommendation 2.

Recommendation 2: Establish a Shared Definition Based on Emerging Literature

The shortage of a single definition of data science and the emerging literature base are two of the most significant barriers to adoption. This coalition recommends finalizing one internally agreed-upon definition grounded in existing TEA and SBOE language and applying it consistently across all communications and advocacy materials. Second, develop a glossary and TEKS-centered taxonomy to support vertical alignment, drawing on the recent NASEM report on K-12 DSE, the Data Science Learning Progressions (DSLPs), and the GAISE II framework. Third, produce a one-page document that helps educators explain what data science and data literacy are and how to address sensitive topics such as the role of local data centers. Fourth, launch a formal research and publication track, beginning with a white paper analyzing alignment among the TEKS, current state assessments, and data science content to show where data science already exists in the curriculum. Finally, conduct an analysis of frequently missed assessment items aligned to data science topics to look for student misconceptions. This gives districts concrete evidence for administrator buy-in since non-tested content receives less instructional priority.

Recommendation 3: Develop Co-Constructed Lessons, a Public Repository, and a Learning Community

The most immediate classroom-level opportunity is to integrate data science into existing subject content rather than asking teachers to adopt a new course. This also supports compliance with HB 2984, which requires every Texas school to teach the technology applications TEKS in grades K-8. Because those TEKS already include a data literacy domain, integrated modules give districts a low-friction way to meet the requirement while building student data fluency. DS4TX recommends developing TEKS-aligned plug-and-play modules that introduce data science through topics already covered in class. Second, co-construct each module with an active classroom teacher paired with a data science expert who assists with data sourcing, cleaning, and instructional design. Third, host the vetted lessons in a publicly accessible, searchable repository organized by grade level, subject, and TEKS alignment. Finally, launch a year-long, low-barrier learning community or cohort offering cross-curricular, multi-grade professional development that culminates in participants creating lessons to share. Cohort members should be encouraged to present at local, state, and national conferences.

Recommendation 4: Build a Stackable Microcredential and Train-the-Trainer Pipeline

Professional learning must respect the severe time and morale constraints on teachers by prioritizing low-barrier entry points. DS4TX and partners should establish a multi-tier, stackable microcredentialing and badging system with clearly scaffolded skill progressions, so that tool anxiety is addressed at each step. The *foundation level* will include low-barrier, visual, and

spreadsheet-based graphical user interface tools that build core data literacy. The *intermediate level* will introduce data science coding environments such as Python or R, targeting secondary CS and CTE pathways. The *advanced level* will cover machine learning and workforce-aligned applications that prepare educators for teaching upper-level coursework. To scale professional learning statewide, the coalition should use a hybrid train-the-trainer model built on existing regional infrastructure. An established teacher-training organization would develop the core materials, TEA could facilitate bringing regional STEM leads into the training, and those leads would train teachers and district instructional coaches in their ESC regions. Coaches and teachers would then establish *data science ambassadors* on individual campuses. This model draws on proven Texas templates such as WeTeach_CS and the Launch K-5 computer science initiative, and it distributes both cost and labor across structures already in place.

Recommendation 5: Establish Career and Technical Education as a Near-Term Pathway

Because introducing an entirely new state-approved course typically takes several years, and SBOE's appetite for new innovative courses is limited, the most realistic near-term strategy is to work through existing CTE structures. Two complementary approaches are proposed. First, incorporate introductory data science language into existing CTE course standards, potentially framed alongside employability skills, as an immediate and low-cost point of entry. Second, develop data-science-aligned curriculum for a course already in the state's approved catalog, such as *Scientific Research and Design*, which allows a functional pilot in far less time than a new course would require. Additionally, a formal IBC for data science is a longer-term, second-tier goal. IBCs development requires coordination across multiple state agencies and follows a five-year review cycle beginning in 2027-2028. Any proposal should be grounded in workforce outcomes research and demonstrate alignment with regional high-wage, high-demand occupations. One consideration warrants particular attention as these recommendations move forward. Funding models tied to IBC completion carry some risk, as CTE funding tied to IBC attainment may decline if certification completion rates remain low, and this should be factored into any strategy that relies heavily on IBC-linked funding streams.

Recommendation 6: Break Down Silos and Expand the Coalition Deliberately

Advocacy and organizational silos across disciplinary areas undermine consistent messaging to local administrators, school boards, legislators, and state officials. The coalition should align the various entities around shared definitions and materials from Recommendation 2, and formalize committee or working-group structures to sustain momentum beyond the convening. This coalition should also include educators, districts, and institutions not yet engaged. EPPs are a particularly valuable growth area, since pre-service teachers could contribute through applied data-analysis projects embedded in existing coursework, an accessible mechanism for both workforce

development and program evaluation. Given the size and demographic diversity of Texas, the coalition should prioritize virtual participation options so regional and rural educators with potential barriers for travel are not excluded.

6. What Happens if We Do Nothing?

First, Texas risks falling behind other states that were already further along in coordinating a unified DSE presence during the last national funding cycle. Continued inaction widens that gap, threatening Texas's position as a leader on a topic related to workforce competitiveness. Second, industry is already signaling the need for data-literate, critical-thinking graduates; without action, this mismatch between employer needs and what schools produce continues, likely pushing more of this training burden onto employers or higher education, later and less efficiently, than if it were built earlier in K-12. Third, Texas has already built real infrastructure (e.g., TEKS, TEA resources, the technology applications guide, and research partnerships). Without a coordinating push, that infrastructure continues to sit unused and invisible, meaning the state is effectively paying twice: once for content that already exists, and again later when it has to rebuild awareness and buy-in from scratch.

Fourth, access to data science already skews toward affluent, urban districts where parents and industry already generate demand. Without deliberate statewide action, that gap grows, since well-resourced districts will keep building informal DS opportunities on their own while under-resourced districts continue to lack even awareness that the option exists. Fifth, the math TEKS revision cycle won't reopen again for roughly five years. If DS4TX doesn't act during this specific window, the next realistic opportunity to embed data literacy language isn't a delay of months but a delay of half a decade. Lastly, DS4TX exists because people showed up, volunteered time, and built trust across sectors. If the convening's findings don't lead to visible action, that goodwill will diminish, making the next attempt to organize a statewide coalition more challenging.

7. Conclusion

Taken together, these recommendations offer a sequenced, resource-conscious pathway toward the coalition's 2030 goal of statewide data science integration. By prioritizing near-term, low-cost actions within existing systems and building the evidence base and coalition infrastructure necessary, we can achieve these targets. Making Texas a leader in DSE will help bring a new wave of data-literate citizens. As we learn to tackle the current technological challenges we face, we can think of the millions of students as a resource worth developing. To keep pace with industry demands, lawmakers must take action by modernizing the TEKS, enhancing EPPs, and creating meaningful PD for in-service teachers. Education should look

forward, and implementing a consistent strategy for data literacy is essential to preparing students for the careers of tomorrow.

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9. Appendices

9.1 Resources

1. Data Science 4 Everyone
    1.1. Teaching Data Science
    1.2. Learning Data Science
    1.3. Datasets
    1.4. Data Science in the Classroom
2. Data Science Learning Progressions
    2.1. Dispositions and Responsibility
    2.2. Creation and Curation
    2.3. Analysis and Modeling Techniques
    2.4. Interpreting Problems and Results
    2.5. Visualization and Communication
3. Concord Consortium
    3.1. Data Science Education Research Community
    3.2. Data Science Education Research Repository
    3.3. Common Online Data Analysis Platform (CODAP)
4. Advanced Career and Technical Education
    4.1. Digital Technology Pathway
5. Institute of Education Sciences
    5.1. Data Science Education

9.2 What Other States are Doing?

1. Alabama
    1.1. Alabama Data Scholars Program
2. Arkansas
    2.1. Arkansas Computer Science and Computing Standards
3. California
    3.1. Data Science Courses Offered
    3.2. Mathematics Framework
4. Florida
    4.1. Career and Technical Education Curriculum Frameworks
5. Georgia
    5.1. Computer Science Pathway
6. Massachusetts
    6.1. Data Science for High School

7. Montana
    7.1. Montana Content Standards for Career and Technical Education For K-12
8. New Jersey
    8.1. Elementary Data Literacy
9. North Carolina
    9.1. Career and Technical Education
10. Oregon
    10.1. Oregon Math Project
11. Utah
    11.1. Proposed K-12 Mathematics Standards
    11.2. Data Science in the Utah K-12 Standards for Mathematics
12. Virgina
    12.1. Virgina Data Science Standards of Learning
13. West Virginia
    13.1. Data Science Standards and Resources