



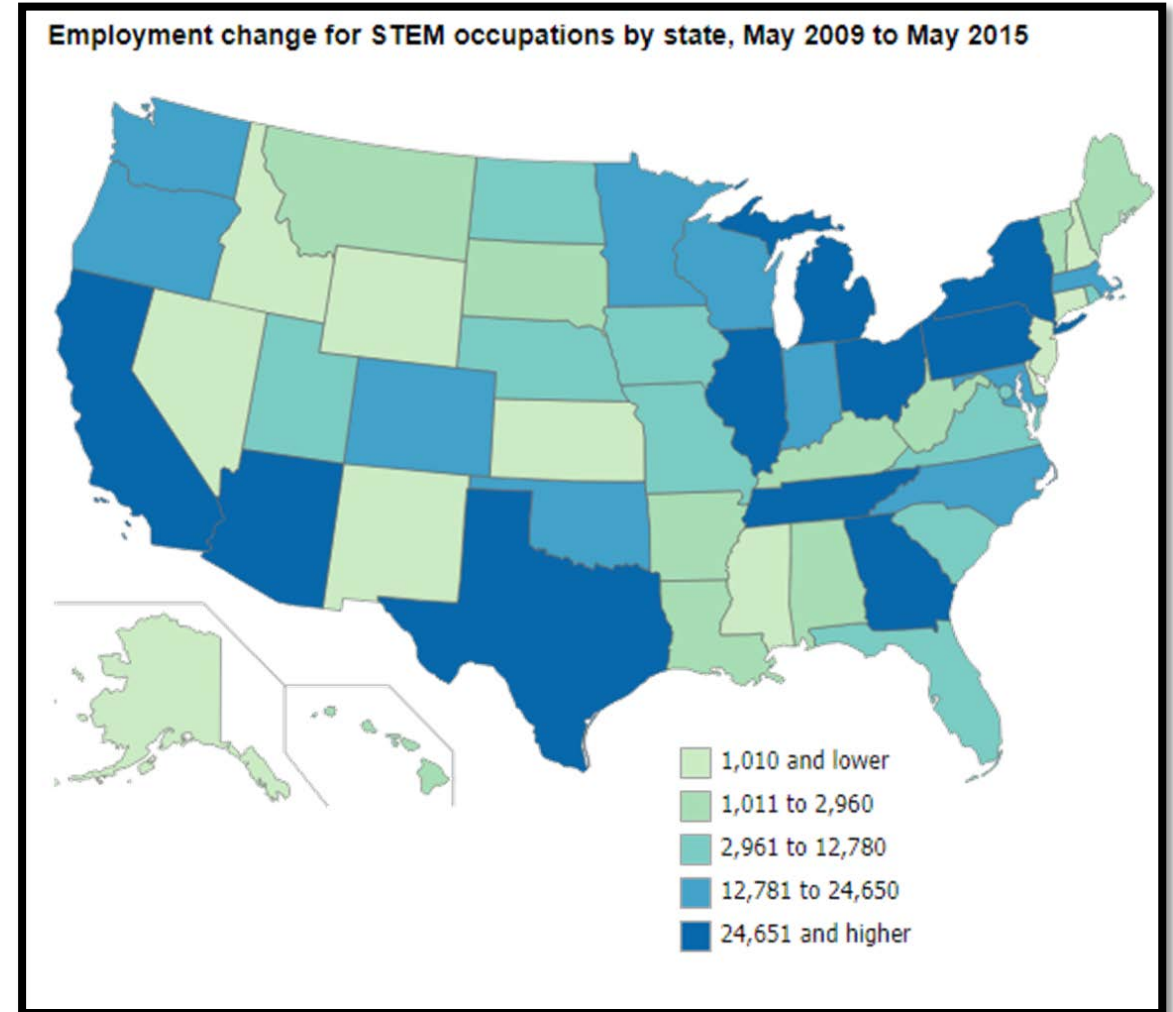
Lonestar STEM Academy

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STEM Coordinator

National STEM Landscape

STEM National Landscape

- **2010** President Obama: *Prepare and Inspire: K-12 Education in STEM for America's Future*.
- **2015** President Obama: 10-year vision for STEM education in the report *STEM 2026 A Vision for Innovation in STEM Education*
- **2018** President Trump: 5-year plan with accountability measures for each state. December 2019 will be the first year of reporting. Each state including Texas was involved in deciding the measures.
- **49 States have an active strategic K-12 STEM plan.**
 - 49 states have anchored STEM skills and Engineering Design Process in Science standards. Texas is writing a plan currently.



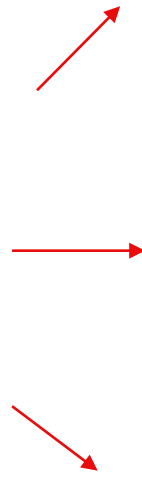


Charting a Course for Success: America's Strategy for STEM Education

Goals for American STEM Education

- **Build strong foundations in STEM literacy**
- **Increase diversity, equity, and inclusion in STEM**
- **Prepare the STEM Workforce for the future**

(Lonestar STEM Academies)



Pathways	Objectives
Develop and Enrich Strategic Partnerships	Foster STEM Ecosystems that Unite Communities
	Increase Work-Based Learning and Training through Education Employer Partnerships
	Blend Successful Practices from Across the Learning Landscapes
Engage Students where Disciplines Converge	Advance Innovation and Entrepreneurship Education
	Make Mathematics a Magnet
	Encourage Transdisciplinary Learning
Build Conceptual Literacy	Promote Digital Literacy and Cyber Safety
	Make Computational Thinking An Integral Element of All Education
	Expand Digital Platforms for Teaching and Learning

Published Dec. 2018 by the Executive Office of the President of the United States

Texas STEM Landscape

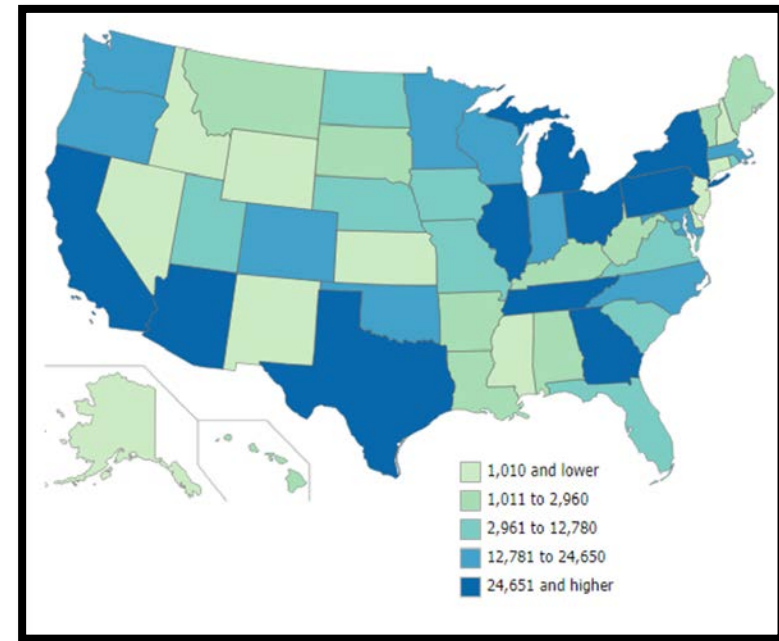
State Landscape for STEM

Texas is expected to have the **second-highest percentage of the nation's future STEM job opportunities.**

Texas Workforce Commission

Currently in Texas:

- STEM programming exists in pockets
- GT/top performing students
- STEM elective courses



We need to shift our focus to **all** students in order to fill the STEM demand in Texas.

STEM Data Points in Texas

- More than **60 %** of middle-skill STEM jobs in TX require **six months or less** of formal classroom training.
- STEM Middle-skill job wages are **\$35,000-\$95,000** per year.
- Demand for middle-skill workers with STEM-related training continues to **increase** and jobs remain vacant.
- Potential earnings for **STEM occupations** are also nearly **double** that of all other jobs in Texas.
- Associate's degree in STEM earns between **\$75,000 - \$100,000**. Slightly greater than those with a Non-STEM bachelor's or master's degrees. **(Potential for Lonestar STEM Academies)**
- Employment in STEM jobs will only increase over the next decade—nearly 25 percent—with significant opportunities in **computing, engineering, and advanced manufacturing fields**. **(Lonestar STEM Academies)**



Thing that surprised
you.



Things you felt were
important



Ways that will
influence the way you
think about advising
young people.

Texas Snapshot: Baseline Date for STEM in Texas

Workforce Need

- **149 STEM** occupations with unfilled jobs representing **162,149** annual openings
- **57** of **149 STEM** occupations representing **82,874** annual openings are middle skill STEM jobs
- TWC predicts Texas will have **1,914,004 STEM** openings in **2026**

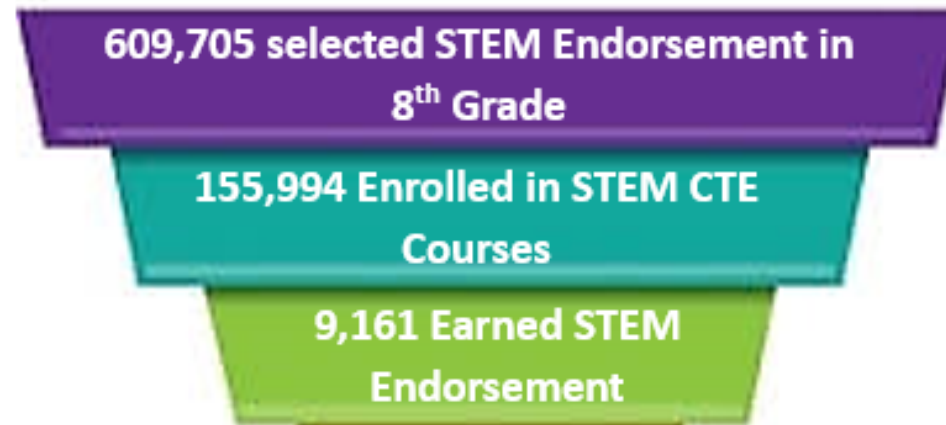
(TEA Labor Market Analysis 2019)

STEM Endorsements

- **609,705** students enrolled in 8th grade to earn a STEM Endorsement (data represents 3 years)
- **155,994** of students enrolled in STEM cluster courses (*students double counted)
- **9,161** students completed a STEM Endorsement in 12th grade (data represents 3 years)

Lonestar STEM Academies should increase STEM Endorsements and close this gap.

STEM Pipeline

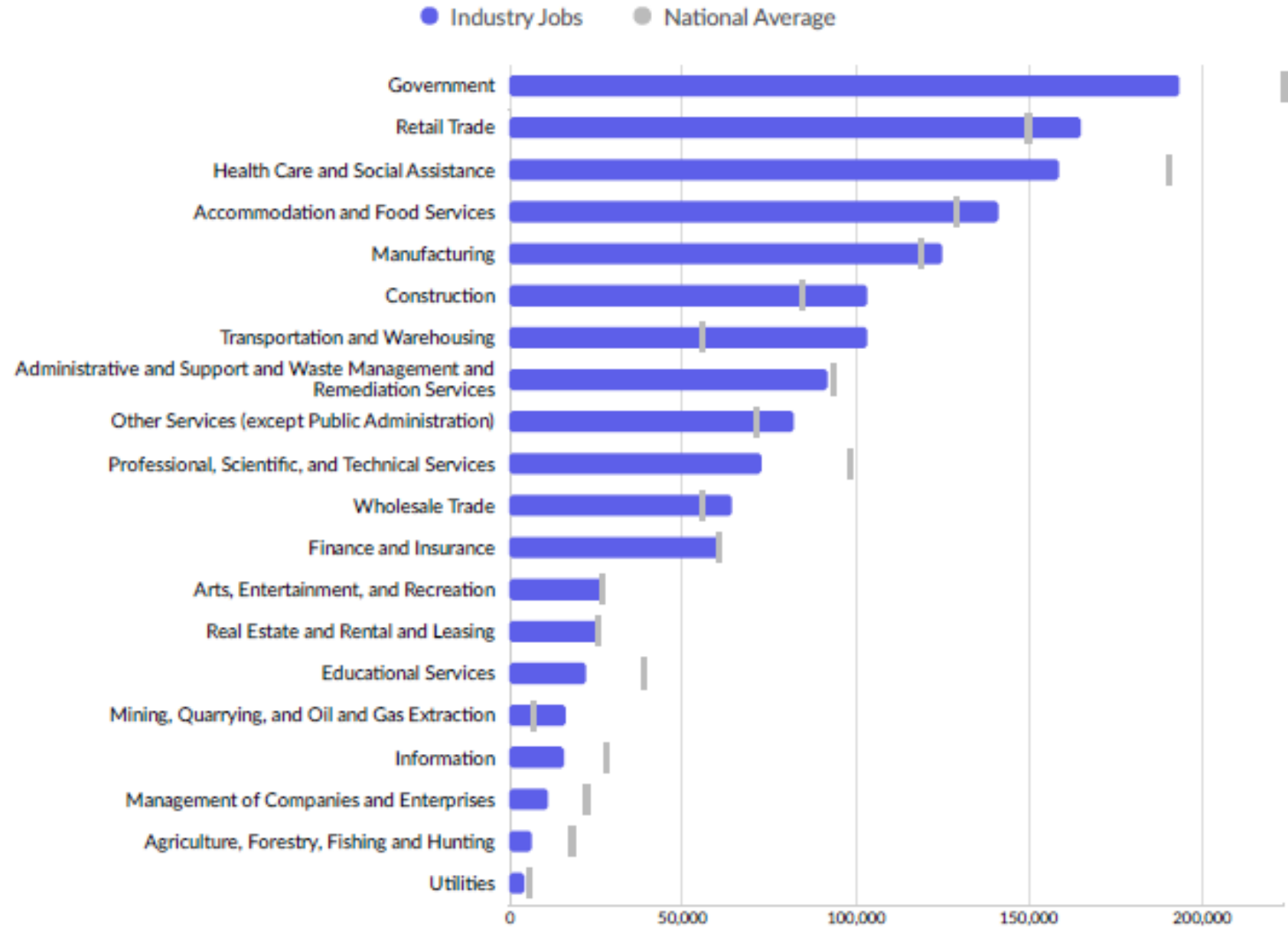


**1.9 million STEM Openings
predicted in 2026**

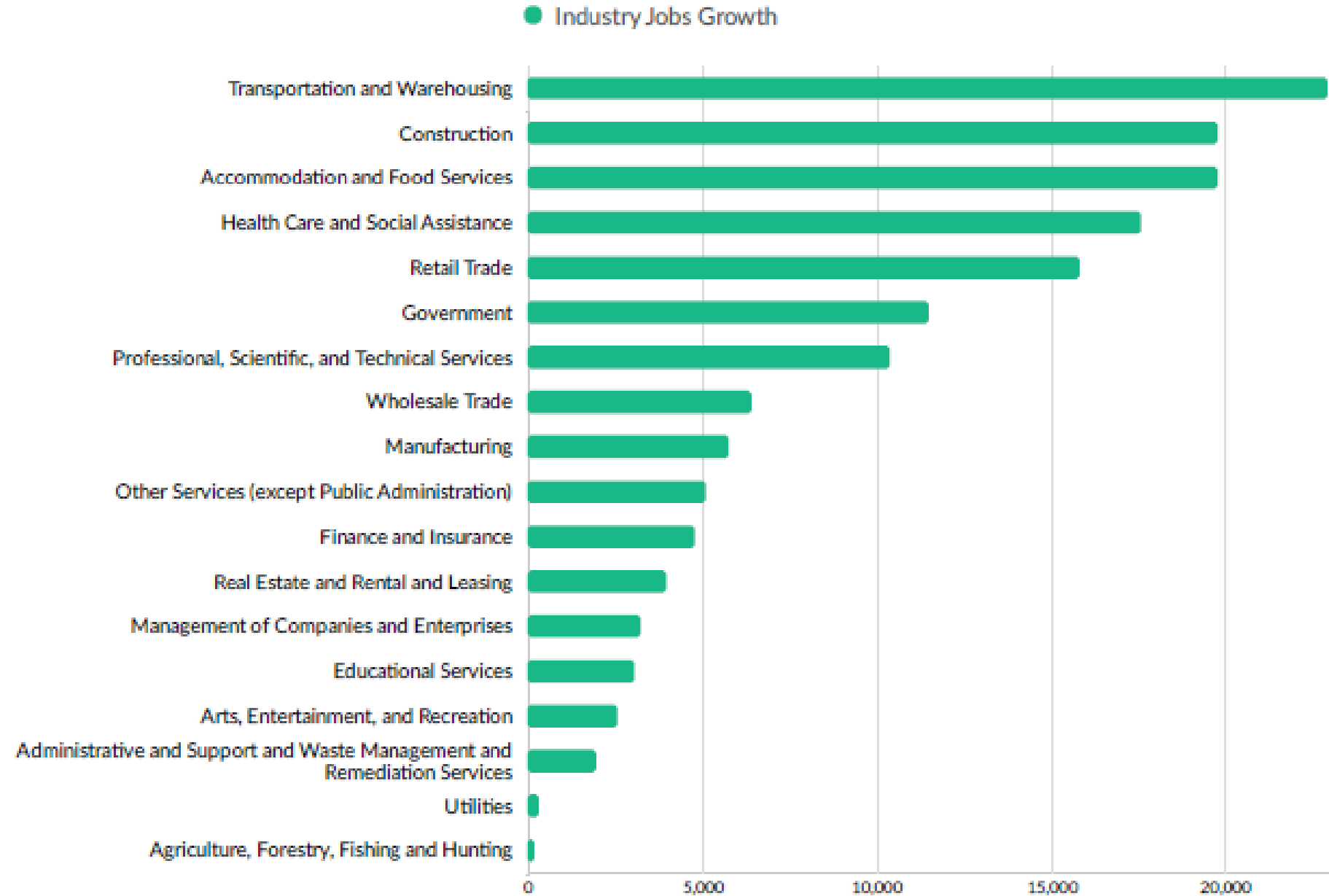
- Do you collect pipeline data?
- Who enters the program? Who completes?
 - Consider gender, race, socioeconomic status

Region 11 Labor Market Data

Largest Industries



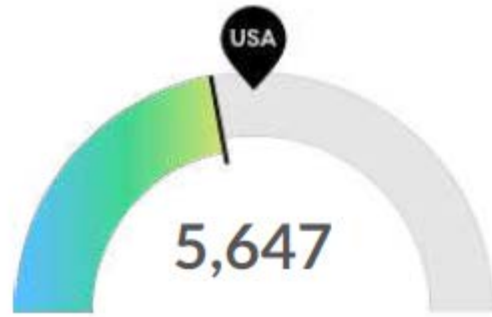
Top Growing Industries



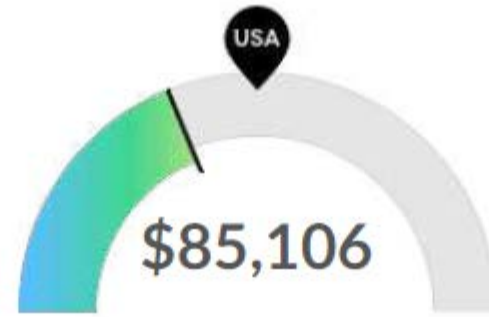
Top Industry Earnings



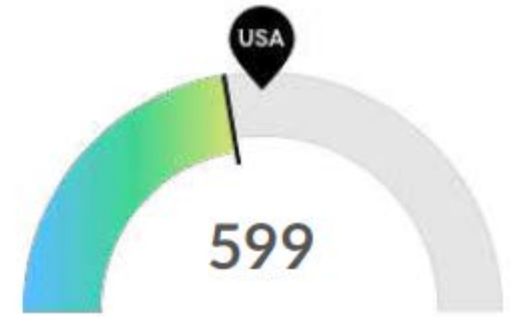
Cybersecurity



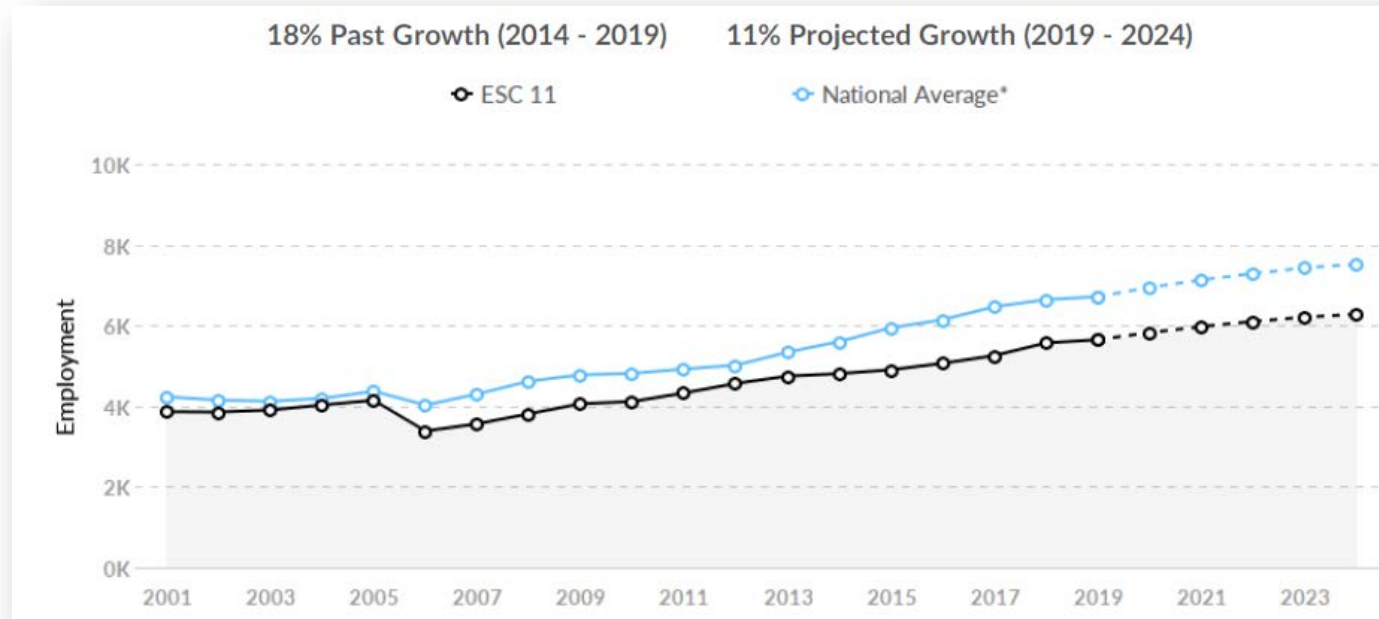
Supply (Jobs)



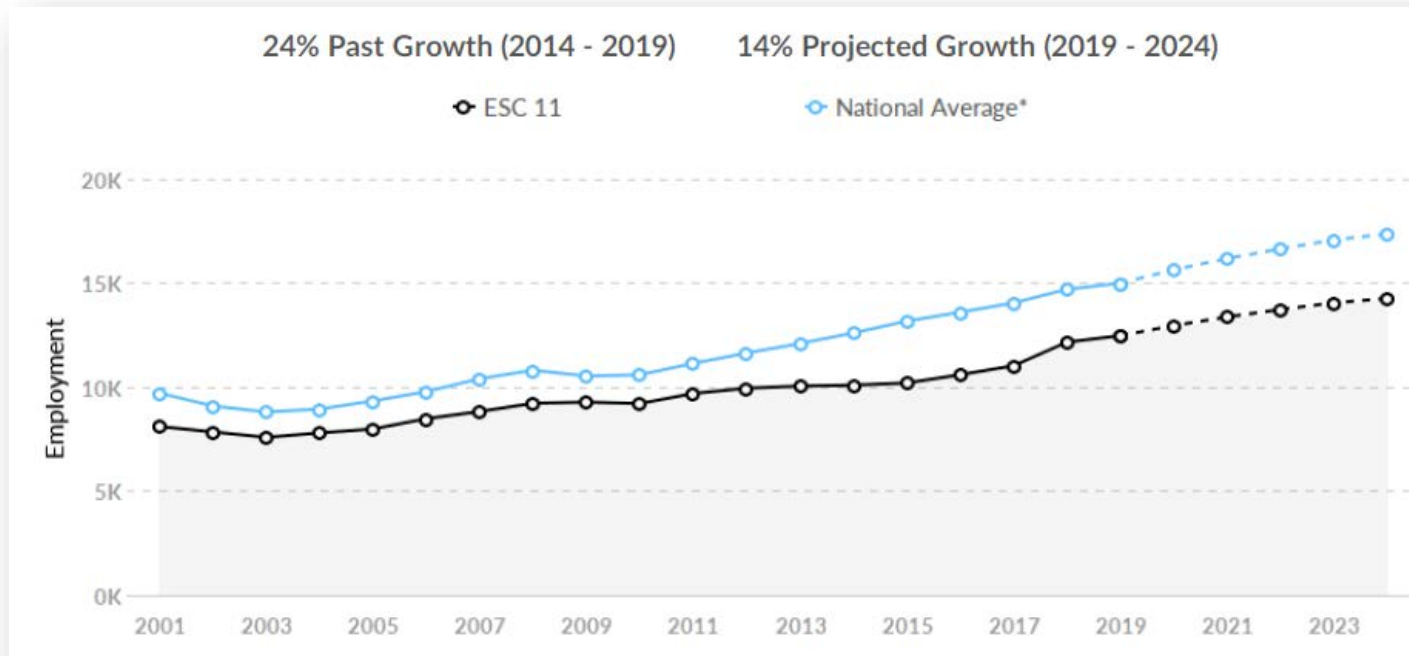
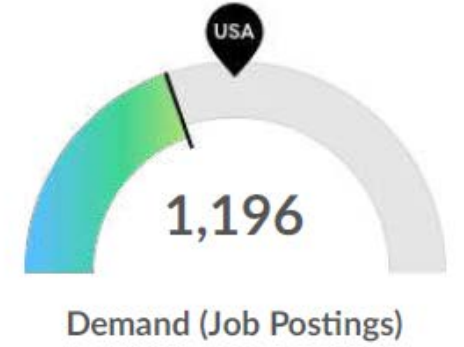
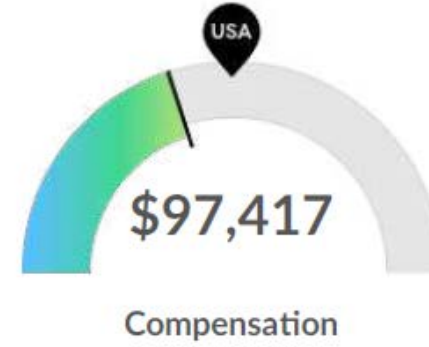
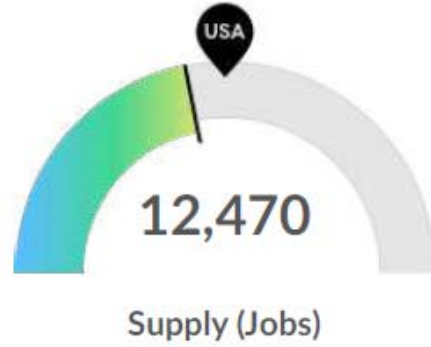
Compensation



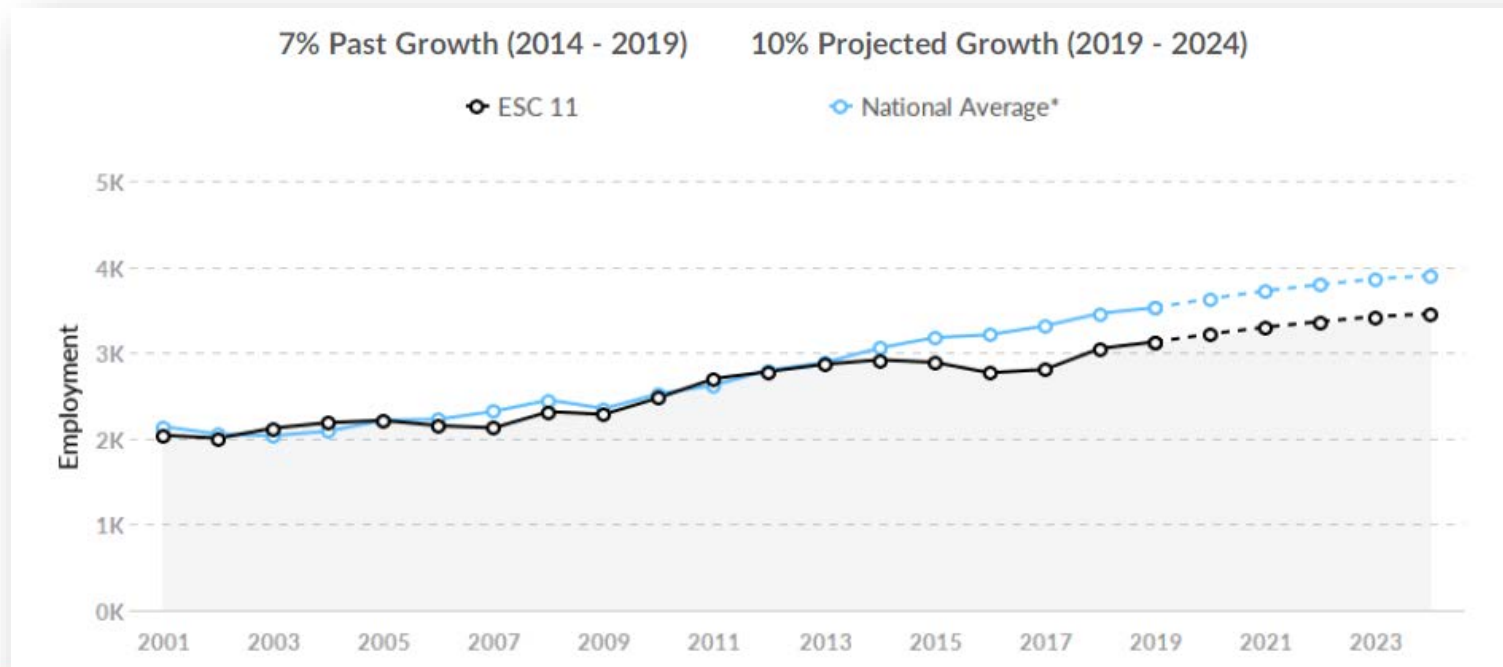
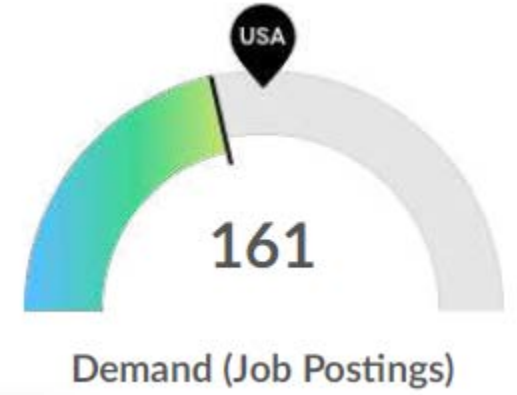
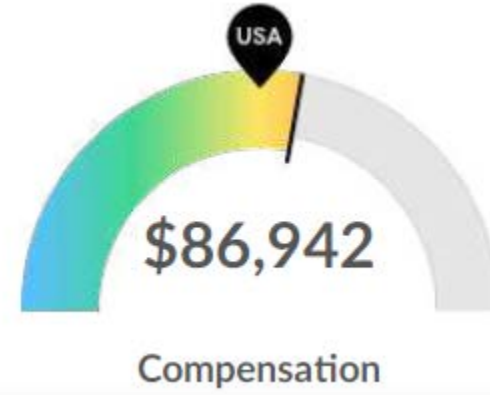
Demand (Job Postings)



Computer Science



Engineering



STEM Vision for Texas

STEM Education is...

- A way of thinking about content
- A method of delivering integrated content (approach to learning)
- Real-world problems presented as part of the curriculum and students are challenged to apply content seamlessly
- Teaching STEM fluency skills that are transferrable

STEM Education is not...

- A course or program
- Turning all students into engineers
- A buzz word
- A fad or short-term endeavor



Texas STEM Education Definition

STEM (Science, Technology, Engineering, and Mathematics) education is a method of hands-on teaching and learning where students learn to apply academic content by creatively solving real-world problems with innovative design-based thinking to prepare students for future career opportunities.



STEM Education Goals

- Ensure **equitable** access to STEM programming across Texas
- Increase **student outcomes** and help guide students into relevant, and engaging pathways that prepare students for future careers
- Vertically align efforts to allow **earlier exposure** to STEM integrated thinking

Your Vision

How does your vision support equity, engagement, and early exposure?

What Texas considers to be the gold standard STEM program

Integrated STEM approach in all core content areas (STEM skills, EDP, and CT)

Science

Math

Social Studies

Language Arts

Aligned

Horizontally aligned (cross curricular)

Vertically aligned (PK-20)

Equitable for all students

Gender

Race

Ability Level

Promotes STEM fluency skills

Communication, creativity, critical thinking, collaboration, resilience, promptness, adaptability, time management

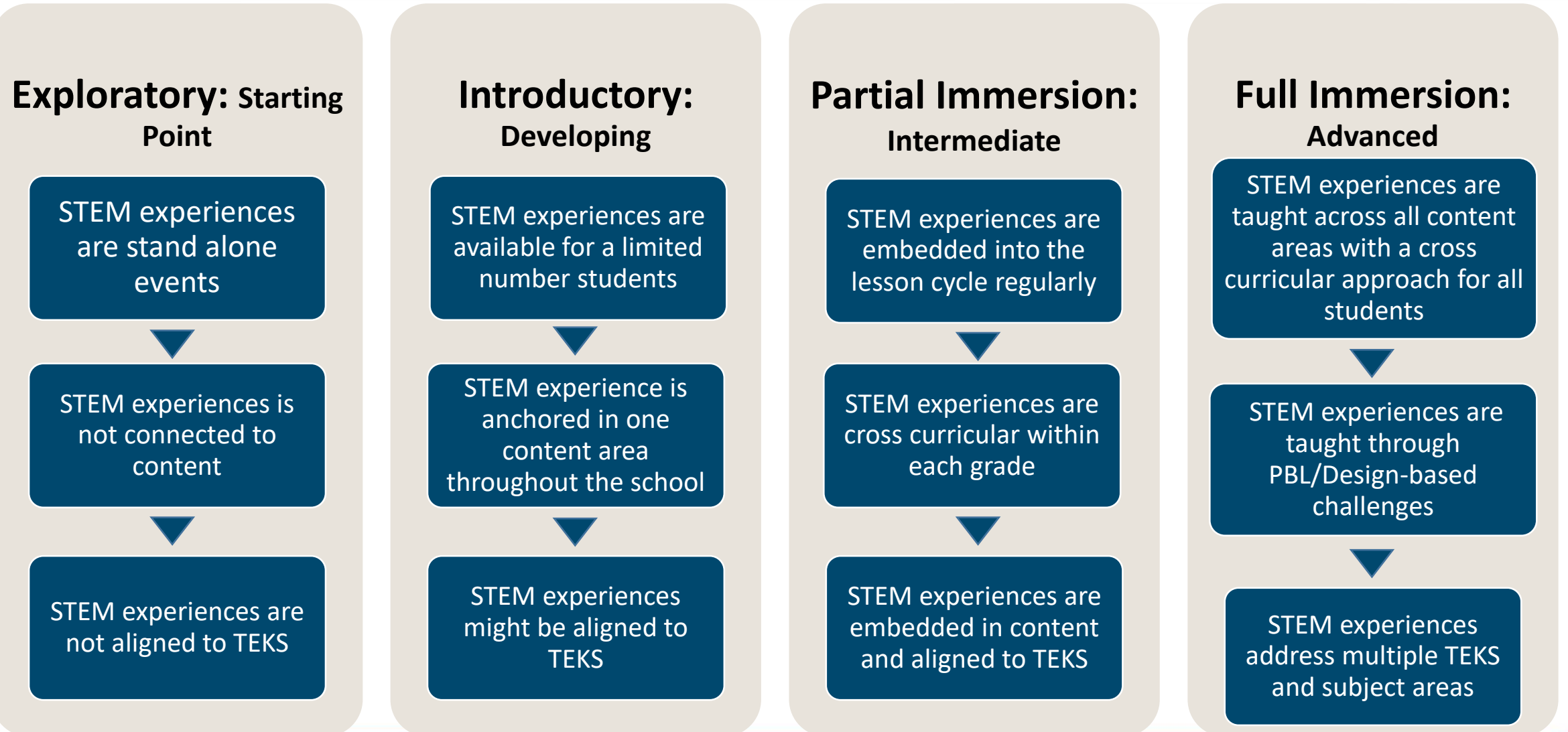
Instructional method

Project/problem-based learning

STEM Models

STEM Education School Models

Lonestar STEM Academies



STEM Immersion Levels

What level of immersion are you at? Why?

How will Lone Star STEM support moving toward full immersion?



Texas STEM Education Continuum

PK > K > 1 > 2 > 3 > 4 > 5 > 6 > 7 > 8 > 9 > 10 > 11 > 12 > 13-16 > 17-20

STEM Awareness

STEM Exploration

STEM Application

Learning STEM Integrated Thinking through Content Application

Communication, Creativity, Collaboration, Critical Thinking, Resilience

STEM Application through Work

Promptness, Time Management, Adaptable, Innovative

Engineering Design Process and Computational Thinking

Lone Star STEM Academies Pilot for Middle and High Schools

Treatment for Lone Star STEM Academies

- Launch, extend, and/or expand a CCRSM with educational pathways that offer high quality, innovative STEM education, computer science, and/or cybersecurity coursework, known as a Lone Star STEM Academy.
- Designate a leadership team to attend webinars and convenings and work with Technical Assistance provider(s) to ensure they meet fidelity of planning and implementation guidelines.
- Foundations of CS for Teachers Online Course, an annual license to the WeTeach_CS for HS Curriculum, and in-person and virtual support through the University of Texas STEM Center.
- Registration costs will be waived for two teachers each year to attend the WeTeach_CS Summit to support them in obtaining their computer science teaching certification.



CCRSM Blueprint Design Elements

	ECHS	P-TECH	T-STEM
Benchmark 1	Target Population	School Design	School Design
Benchmark 2	Partnership Agreement	Target Population	Target Population
Benchmark 3	P-16 Leadership Initiatives	Strategic Alliances	Strategic Alliances
Benchmark 4	Curriculum and Support	Curriculum, Instruction, & Assessment	Curriculum, Instruction, & Assessment
Benchmark 5	Academic Rigor and Readiness	Work-Based Learning	Work-Based Learning
Benchmark 6	School Design	Student Support	Student Support

T-STEM and ECHS Blueprint Comparison

Strategic Alliances

- **Final, signed and executed MOU with Business/Industry partner**
- **Advisory Board Meeting Agenda and Minutes(with action items and decision logs)**
- **A list of strategic partners with each member's organization, title and role in providing WBL for students by grade level**

C&I and Assessment

- **Documentation detailing a minimum of three course of study examples that outline student pathways from high school, to associate degrees, to work credentials and beyond**
- **Curriculum Alignment Documents**

Student Support

- **Bridge program calendar and curricula**
- **Tutoring and other intervention/remediation program schedules**
- **Schedule of regularly scheduled counseling/advisory events and records of completion for these support services.**

Work-Based Learning

- **Documentation of appropriate WBL available for students at all grade levels (6-12)**
- **Current dated regional high-demand STEM occupation list**
- **Aggregate data describing T-STEM student participation in WBL experiences as well as percentage of students earning industry certification and credentials by type**

Additional Lone Star STEM components that ECHS will need to meet

T-STEM and P-TECH Blueprint Comparison

Work-Based Learning

- Documentation of appropriate WBL available for students at all grade levels (6-12)
- Current dated regional high- demand **STEM** occupation list
- Aggregate data describing **T-STEM** student participation in WBL experiences as well as percentage of students earning industry certification and credentials by type

Additional Lone Star STEM components that P-TECH will need to meet

School Design

- Leadership team may include **Informal STEM provider**
 - Museum
 - Science center
 - STEM professional association
 - Community-based organization, such as the Boys and Girls Club or Explorers Club
- Offering of **informal STEM experiences** for students that include:
 - Content-focused field trips
 - Opportunities for students to identify and solve real-world problems
 - Engagement with a diverse population of STEM experts

Strategic Alliances

- Documentation of entry-level knowledge, skills, and abilities for each pathway occupation, including necessary **employability skills**
- For **capstone work-based learning experiences**, a data sharing agreement that includes provisions to capture and monitor student growth on the knowledge, skills, and abilities over the course of capstone work-based learning experiences as defined for each occupation
- Opportunities for **business and industry partners** to **assist teachers in developing real-world, industry-based problems STEM projects**

Curriculum, Instruction, and Assessment

- The Lone Star STEM Academy shall establish or expand **one or more STEM pathways** that are informed by regional and state workforce and economic development needs and contribute to students earning credentials and certifications that prepare them for high-wage, high-demand, high skill STEM occupations.
- The Lone Star STEM Academy shall adopt an **interdisciplinary approach** to learning where academic concepts are coupled with real-world experiences through **Project or Problem Based Learning (PBL) and Engineering Design Challenges** that are offered regularly throughout the school year. This curriculum should be organized around the STEM competencies and supports teaching for a deeper understanding of STEM that is based on current research of how students learn and is **connected to real-world contexts and careers in STEM fields.**

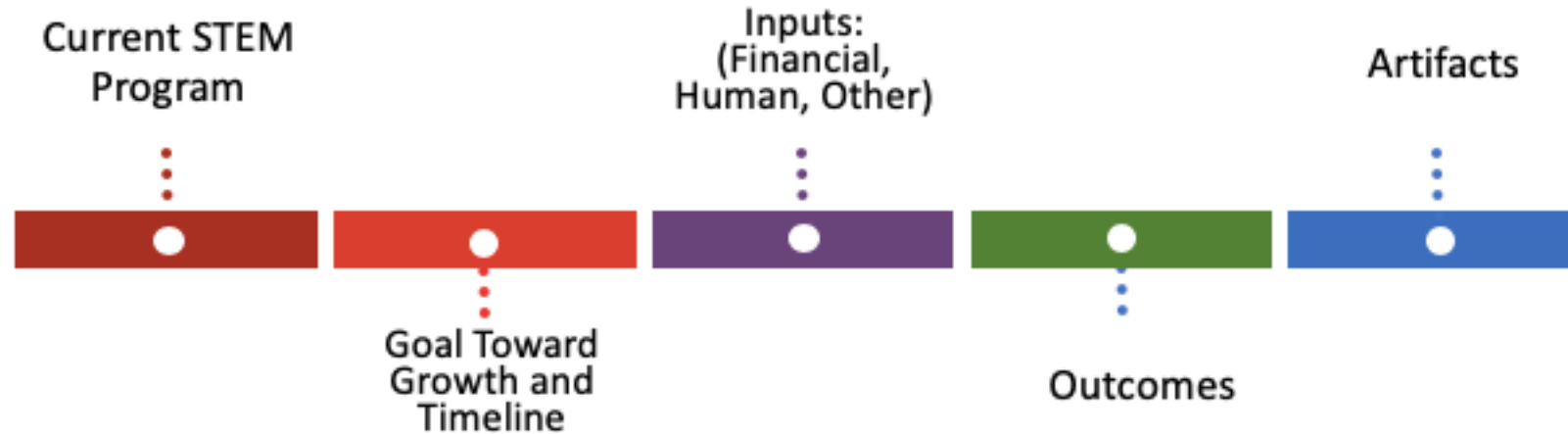
Work-Based Learning

- Career counseling and guidance resources that align to state and regional STEM workforce needs and pathways options
- The Lone Star STEM Academy ensures that students understand the required academic, technical, and employability skills necessary for a career path
- Demonstrate their learning in writing, portfolio, presentation, digital, or by other means of authentic learning and skill development related to industry expectations

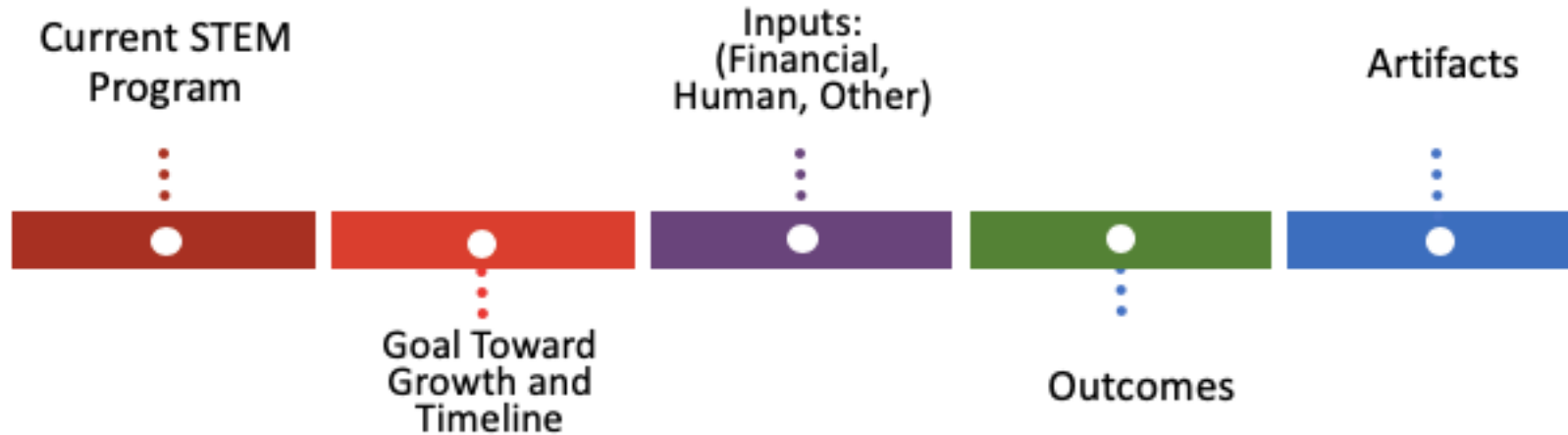
Instructional and Annual Professional Development Requirements

- **STEM Project/Problem Based Learning including the Engineering Design Process**
- **Inquiry-Based Student Centric Instruction**
- **Technology Literacy and Integration**
- **Embedded Literacy Instruction/Strategies**
- **Collaborative Teaching and Learning**
Additional Professional Development:
- **Content Training for Educators**

- **Formative peer observations**
- **Collaboration opportunities with feeder pattern focus groups, industry, and IHE partners**
- **Common planning times**
- **Cross-curricular collaboration between content areas including academic and CTE educators**
- **Opportunities for cross-disciplinary co-teaching**
- **Building in- and out-of-school activities through the ecosySTEM**



Which students will you target? How will you recruit? Who will recruit?
How will you support the diversity of the students expected to be engaged?
What career advising supports exist? Which new ones need to be built?
What is your messaging plan for students and parents?

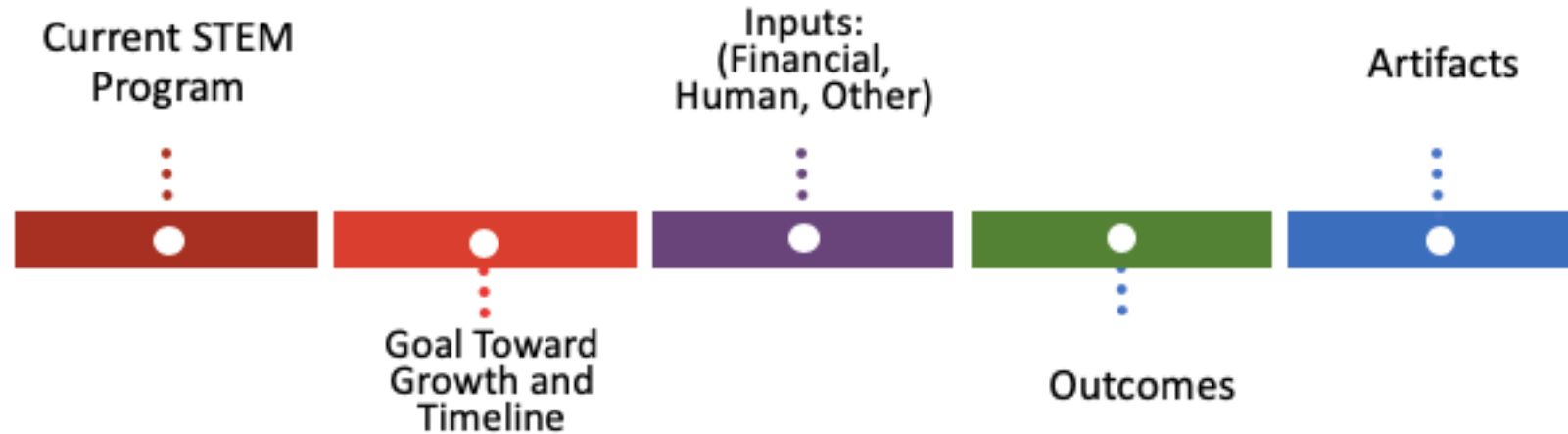


What related work across the district and college, if any, is underway?

How will you incorporate professional development for the Lone Star STEM teachers?

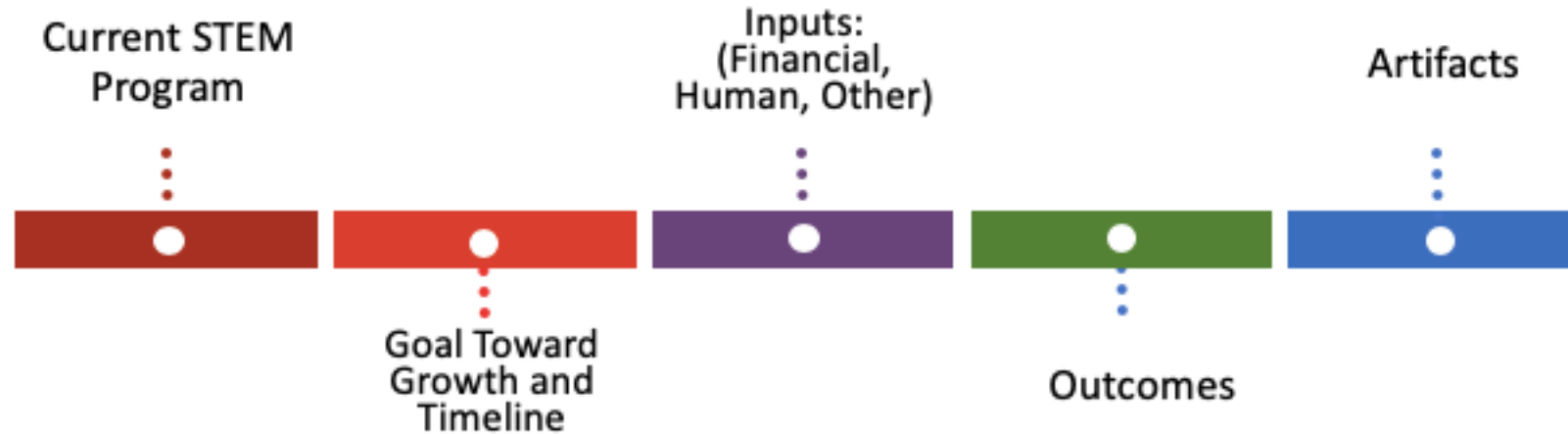
STEM project/PBL
inquiry-based student centric instruction
collaborative teaching and learning

embedded literacy instructions/strategies
technology literacy and integration
content training for educators



What staff are in place, such as program management, guidance, counseling, instruction?

What leadership structure do you have in place? Is this an expansion of a current leadership structure, or does a new one need to be built?



Are you currently offering a STEM endorsement?

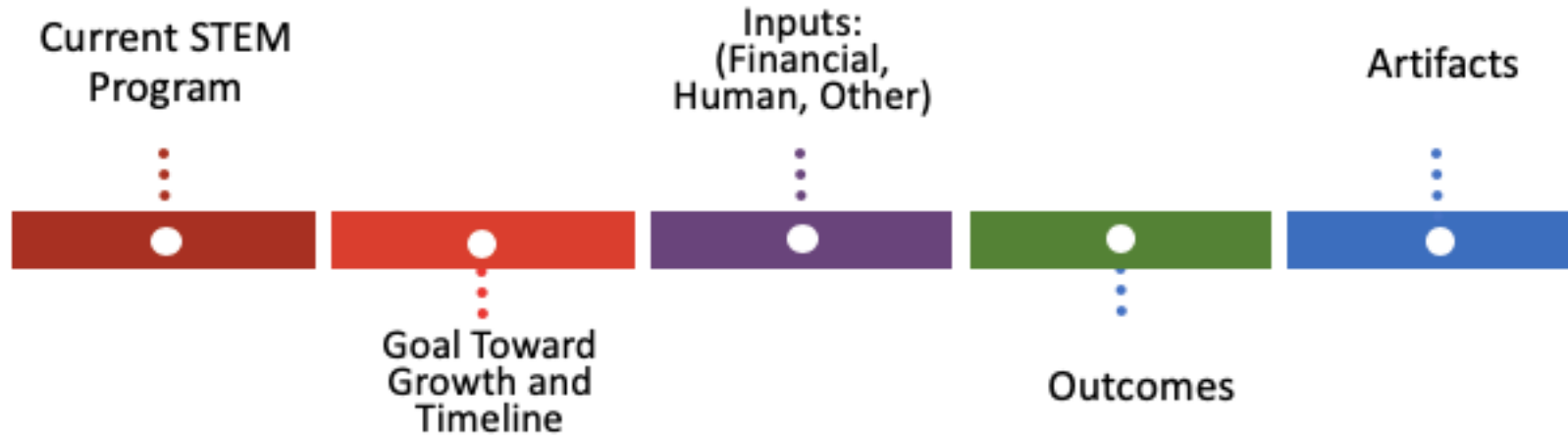
What dual credit partnerships do you already have in place?

What types of dual credit courses are students taking already?

What program of study are you adding through the grant, specifically in dual credit coursework?

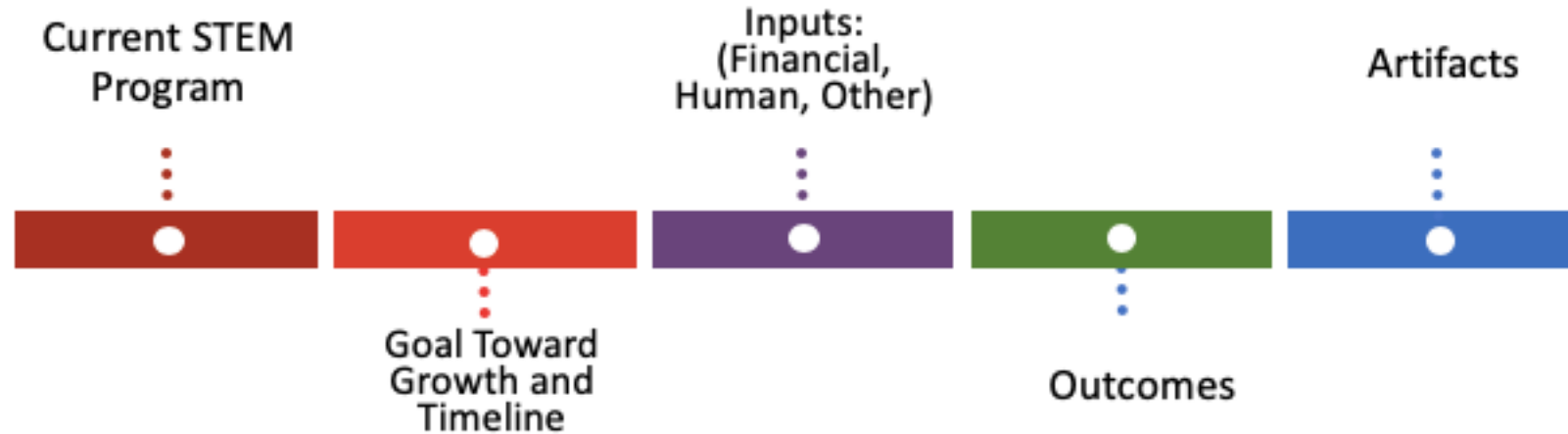
What postsecondary degrees, certificates, and/or occupations will the program of study lead to?

What, if any, limitations do you foresee with high school students taking college courses?



Will any curriculum be added, augmented, or modified?

How are these opportunities helping students with employability skills?



Which employers are offering your WBL opportunities?

What types of WBL experiences are currently offered? Specifically for LSS?

What, if any, limitations do you see in bringing in relevant and local employers?

What components of your program do you think are particularly strong and worth building upon?

Strengths

**What would you like to
build, fix, solve, learn from
others, or capitalize on?**

Growth Opportunities