

Minnesota STEM cradle-to-career logic model & key measures

🌀 STEM key measure

	Support early learning All young children require an environment supportive of early learning and development of skills that will enable them to succeed in school. Supporting young children in STEM also includes providing opportunities to introduce math and science concepts through fun, play-based activities.	Inspire interest Interest in STEM can be nurtured early. Hands-on and experiential learning opportunities encourage curiosity and confidence in understanding and applying STEM skills to everyday life. Providing both in- and out-of-school activities in elementary and middle school can build lifelong interest in STEM.		Make connections and build foundations During middle school, students should have meaningful experiences that inspire, build connections, and help them see themselves in STEM. Students also need to build a solid academic foundation to succeed in high school math and science coursework, as well as the ability to apply STEM knowledge and skills to solving real-world problems.	Excite, challenge, and prepare Whether they plan to pursue college or a workforce training program, all students require a rigorous core math program in high school to prepare for their future. More advanced math and science coursework can provide a gateway to achievement and foster meaningful connections in STEM.	Work, advance, and innovate STEM-literate workers are critical to Minnesota's knowledge-based workforce. Our continued advancement as a state requires workers with the ability to innovate, solve complex challenges, and flourish in an environment with rapidly changing technology.	
	Early childhood	Early Elementary (K-2)	Late Elementary (3-5)	Middle School (6-8)	High School (9-12)	College, career & job training	Early-Mid Career
← Inputs Resources, opportunities, and activities that contribute to the STEM continuum.	<ul style="list-style-type: none"> Healthy, stimulating home environment Children screened for potential health and development problems (🌀Early childhood screening, MDE) Quality early childhood education Informal STEM learning opportunities providing hands-on, real-world experiences Parents supportive of student interests and learning in STEM 	<ul style="list-style-type: none"> Teachers equipped to teach and inspire interest in STEM Instruction and assessment in all domains of STEM, including science, technology, engineering, and math Integrated STEM education which makes connections across STEM subjects and with other subjects Quality in-school STEM learning experiences and time spent on STEM (🌀Classroom time spent on science per week in 4th grade, NAEP) Informal STEM learning opportunities providing hands-on, real-world experiences Community partnerships among education, community organizations, businesses, and other sectors to support learning Parents supportive of student interests and learning in STEM 	<ul style="list-style-type: none"> Teachers with deep content knowledge as well as skills in teaching STEM subjects (🌀Teacher supply, MDE) Instruction and assessment in all domains of STEM Integrated STEM education Quality in-school STEM learning experiences and time spent on STEM Informal STEM learning opportunities providing hands-on, real-world experiences Community partnerships to support learning Parents supportive of student interests and learning in STEM 	<ul style="list-style-type: none"> Teachers with deep content knowledge as well as skills in teaching STEM subjects Instruction and assessment in all domains of STEM Integrated STEM education High school programs aligned with college- and career-readiness standards Availability of advanced STEM coursework Availability of career-exploration and internship opportunities Informal STEM learning opportunities providing hands-on, real-world experiences Community partnerships to support learning Parents and STEM businesses supportive of student interests, learning, and career exploration 	<ul style="list-style-type: none"> High school graduates interested and able in STEM STEM career and technical education (CTE) and college degree programs aligned with employer needs STEM workforce training programs Educational supports for students underrepresented in STEM Availability of career-exploration and internship opportunities STEM businesses with connections to college and workforce training programs Demand in STEM fields Informal STEM learning opportunities providing lifelong learning 	<ul style="list-style-type: none"> Workers with skills and education matched to employer needs STEM job vacancies (🌀Occupational projections, DEED) Competitive salaries and benefits in STEM fields Supportive work environments and clear opportunities for advancement Informal STEM learning opportunities providing lifelong learning 	
← Outputs What happens as a result of those opportunities and activities.	<ul style="list-style-type: none"> School-readiness concerns are addressed early. Children use early science and math skills in hands-on and play-based activities. 	<ul style="list-style-type: none"> Students participate in high-quality, inspiring in-school and out-of-school STEM learning opportunities. Students have hands-on, real-world experiences in STEM. 	<ul style="list-style-type: none"> All students have quality in-school and out-of-school opportunities in STEM. (🌀8th-grade participation in science activities not for schoolwork, NAEP) All students have opportunities to apply learning to solving real-world problems. 	<ul style="list-style-type: none"> All students receive rigorous core math and science program. Students are aware of STEM career opportunities and pathways. All students have basic STEM skills important in daily life and a variety of fields. Students can use STEM skills to solve challenges. Students understand why STEM is important. High-achieving students pursue advanced STEM coursework. 	<ul style="list-style-type: none"> Students pursue STEM college majors, CTE programs, and workforce training. Students persist in STEM education and training programs. Individuals engage in lifelong learning in STEM. 	<ul style="list-style-type: none"> Individuals with STEM education and training pursue jobs in STEM fields. Workers persist in STEM fields. Workers are equipped to navigate multiple STEM occupations or careers in today's rapidly changing environment. Individuals engage in lifelong learning in STEM. 	
Outcomes The changes or benefits that result.	<ul style="list-style-type: none"> Children develop early numeracy skills and understanding of scientific concepts. Children begin developing positive views of STEM. 	<ul style="list-style-type: none"> Students are inspired in STEM. (🌀4th-grade interest in science, NAEP) Students have proficiency in basic skills in STEM. (🌀5th-grade science proficiency, MCA) High-achieving students in STEM reflect all population groups. 	<ul style="list-style-type: none"> Students are inspired and confident in STEM. Students understand connections across science, technology, engineering, and math, and between STEM and other subjects. Students complete middle school with proficiency in foundational STEM skills. (🌀8th-grade math proficiency, MCA) High-achieving students in STEM reflect all population groups. 	<ul style="list-style-type: none"> Students complete high school both interested and able in STEM. (🌀High school graduates' interest/ability in STEM, ACT) Students understand connections across science, technology, engineering, and math, and between STEM and other subjects. Students complete high school ready for college and technical training programs. High-achieving students in STEM reflect all population groups. 	<ul style="list-style-type: none"> Students have the STEM skills necessary to succeed in college and workforce training programs. Students complete STEM degree and training programs. (🌀Postsecondary certificate/degree completion by field & award level, IPEDS) High-achieving students obtain advanced degrees. Certificate/degree recipients in STEM reflect all population groups. 	<ul style="list-style-type: none"> Individuals have 21st century skills which enable them to solve daily challenges and be engaged citizens and productive workers. Workers succeed in STEM fields, persisting and advancing from early to mid-career. (🌀Occupational employment, DEED, ACS) Higher-level STEM positions reflect all population groups. STEM job vacancies are filled and workforce needs are met. STEM skills are used to solve real problems and develop innovative solutions. 	
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							GOAL Minnesota has a thriving, innovative, equitable STEM workforce and economy.