

## CONCLUDING RECOMMENDATIONS FOR ACTION

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Our culture sends girls the message that they might not be cut out for STEM careers and should focus their energies on areas that are traditionally female. These messages lead many girls to drop out of STEM pathways before the end of high school. As a result, young women miss out on the chance to work in STEM fields, which include careers that generally pay better than non-STEM careers and provide livable wages.

As practitioners and parents, it is critical to have a guide to help focus how we can best support girls at all stages of their development and provide them with educational opportunities so they can enter and persist in STEM fields. Our job is to nurture their curiosity and provide opportunities for them to learn through play and their everyday environment. As curious children, they will have better opportunities to ask questions, shape their future, thrive in this ever-changing world, and ultimately, solve 21st-century challenges.



Parents, caregivers, and teachers can help young girls, newborn to age 5, develop their sense of curiosity. They can provide toys, like blocks, that promote thinking, creativity, and innovation. They can encourage girls to get dirty and explore outside and test their own age-appropriate hypotheses by seeing what happens when they jump in puddles and splash water. As early as 5 years of age, girls can write binary code with simple programs like Scratch. They can build, test, and share prototypes with their peers and community. They can also learn to manipulate 3-D objects, transform them in their minds, and develop strong spatial reasoning skills.



A curious child can learn to ask deep questions. As girls grow, they develop questioning skills that can help them define problems and seek solutions. From ages 6 to 10, girls need integrated STEM instruction in their classrooms from teachers who have had the chance to build math and science confidence, and who understand the design cycle. Instructors can offer hands-on learning and problem-solving opportunities that engage and excite girls. Girls at this stage begin to develop interest in STEM through extracurricular activities. Community organizations play a critical role in providing experiences that can ignite curiosity and help girls form a STEM self-identity.



BY AGE 13

As girls enter early adolescence, from ages 11 to 13, access to opportunities can shape their future. It is during this stage that girls begin to recognize the often-negative messages that society delivers regarding science, technology, and a woman's place within STEM. Often, adults promote more opportunities to create, build, and test for boys, so girls need to acquire the tools to advocate for those opportunities. Implicit bias also plays a role. Adults often perpetuate the message that girls do not belong in STEM. Parents and teachers need to provide tools of empowerment so girls themselves can be agents of change. Adults can also bring about changes by making certain girls benefit from the same STEM educational experiences as boys.



BY AGE 18

In adolescence, from ages 14 to 18, girls face challenges that hinder their ability to prepare for STEM careers, such as doubt in their own abilities. Adults must counter these messages by helping young women understand that people are not born with STEM skills, but develop them over time. Girls need tools of empowerment during their teenage years to defend their STEM interests while preparing themselves academically to graduate from high school. Girls can build confidence and benefit from opportunities that prepare them to solve problems with 21st-century skills. They also need access to work-based experiences so they can eventually have financially sustaining careers in STEM fields.



BY AGE 19 &amp; BEYOND

Beyond 19 years of age, young women need the chance to thrive in STEM fields and contribute to potentially world-changing developments in areas like engineering, computer sciences, and medicine. Young women need tools to help navigate the complex educational journey in the post-secondary space. Some STEM careers require mid-skill training and other STEM opportunities are high-skill careers. Understanding the on-ramps and off-ramps to access STEM opportunities early in their careers, and how to retrain if necessary, helps women stay in, and succeed in, STEM fields.



## VISION

The resources, strategies, and activities in this guide can change the environment for girls from one that throws up barriers and limits their career options to one that opens up pathways to STEM. Parents and caregivers, educators, and community organizations that serve girls must promote opportunities so girls see themselves as capable of pursuing a STEM career and so that they are STEM-ready. In STEM fields, girls will find careers that pay a living wage and give them the chance to make the world a better place with their ideas and innovation. By changing the way we interact with girls in the classroom, at home, and in other learning environments, adults can expand girls' opportunities so that they really can be anything they want to be.

## SUMMARY OF RECOMMENDATIONS

### STRATEGY 1

#### **Provide opportunities for mastery experiences.**

- Girls underestimate their abilities, especially as they get older. Help them recognize what they can do and recognize their work.
- Have girls take ownership of their decisions and help them with language so that they can advocate for themselves.

### STRATEGY 2

#### **Provide opportunities for girls to learn by observing others.**

- Female role models and mentors can help girls see themselves as future STEM professionals.
- Seeing female role models and mentors in action inspires girls.

### STRATEGY 3

#### **Provide opportunities for girls to be recognized as innovators by their peers and their community.**

- Empower girls to lead teams so boys and girls alike recognize them as creators.

**STRATEGY 4****Take a holistic approach. Help girls cope with the misconceptions and biases that stand in the way of STEM engagement.**

- Teach girls about growth mindset and how it impacts their sense of self.
- Educators and caregivers can be mindful of their own behavior and challenge biases that can stand in the way of STEM experiences and engagement for girls.

**STRATEGY 5****Educators and community organizations can provide opportunities for parents/caregivers to see their daughters practicing science, technology, and engineering skills and solving problems using math.**

- Design events, such as family STEM nights, and put girls in charge. Parents will feel proud of their girls and expand their understanding of what their daughters are capable of doing.
- Put girls in the spotlight whenever parents come to school. This can be through community nights, in design or science labs, in school gardens, or by integrating STEM into other parent-related activities in which girls take the lead.

**STRATEGY 6****Give parents/caregivers ideas about how they can continue STEM learning at home with their children.**

- Parents/caregivers can influence a girl's career trajectory and expose their daughters to a variety of STEM learning opportunities.
- Teachers can provide tools for parents to continue working on STEM learning at home. Develop age-appropriate STEM learning idea sheets to get them started.
- Community organizations should make a commitment to reach out to parents to continue STEM learning at home. Extracurricular opportunities can set the foundation for girls to explore STEM opportunities.

**STRATEGY 7****Educate parents/caregivers on how best to advocate for advanced STEM opportunities for their daughters.**

- Parents need tools to understand different types of STEM opportunities that may be available so that they can advocate for schools and community organizations to bring those opportunities to their community, if they are not yet offered.
- Invite parents to connect with teachers and school leaders about implementation of the latest educational policies as they pertain to women and girls.
- Parents can also build relationships with elected officials to share their thoughts about STEM education and career opportunities for women and girls in their communities.
- Parents and community members can advocate for internships and apprenticeships with STEM employers.

**STRATEGY 8**

**Show parents and caregivers where they can find STEM opportunities for their girls.**

- Community organizations can work together to have one database to list all programs by location and type of opportunity, such as [The Connector](#), and keep information current.

**STRATEGY 9**

**Educators and community organizations can provide multi-faceted communications about how STEM relates to students' daily lives and everyday experiences.**

- Offer opportunities for families to engage in citizen scientist programs and develop programs for families with multiple touch points. These can include field studies, family STEM nights, and community share-out days.

**STRATEGY 10**

**Help educators access and share STEM resources.**

- Educators need resources that build their understanding of integrated STEM education, such as the chance to see what a great STEM classroom looks like and how great STEM teaching can tap into their students' potential.
- Teachers can find funding opportunities for professional development through resources like the National Science Teachers Association.

**STRATEGY 11**

**Provide training and resources for educators to develop curriculum that is inclusive of girls, including girls of color.**

- We all have hidden biases. Uncovering our hidden biases can help us discover steps to take so that we do not unintentionally exclude certain students from STEM experiences.
- Parents can examine how they treat girls and boys, and thoughtfully consider if they offer different types of toys or experiences to girls that do not foster STEM skills.

**STRATEGY 12**

**Link educators with industry partners so they can see and experience the work of STEM professionals.**

- Educators can use STEM professionals and their experiences to create meaningful, engaging units of studies for students.
- Girls then benefit from hands-on learning and educators can help their students explore authentic problems in STEM.





## THE WOMEN'S FOUNDATION OF COLORADO HOPES THAT IN THE NOT-SO-DISTANT FUTURE...

STEM professions reach gender parity, with women across the nation equally represented in STEM careers.

Women in STEM are sought out as experts and developers of new technologies.

STEM professions have the prestige and status equal to famous athletes and movie stars and get paid accordingly.

STEM professions attract from a pool representative of the racial and ethnic diversity of the United States.

STEM education is included as part of in-school and out-of-school learning experiences for all students, including students in rural Colorado.

Women in STEM contribute to innovations and policies that improve the human condition.

Women in STEM celebrate their professions and are recognized by community leaders for their problem-solving skills and innovation AND their passion and enthusiasm.