Girls in STEM

CLOSING THE GENDER GAP
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Advantages of the STEM Field

- A typical STEM worker earns two-thirds more than those employed in other fields (Pew Research Center).
- Science and engineering occupations are predicted to grow faster than the average rate for all occupations.
- However, gender gaps are particularly high in these areas.
Why Women in STEM?

**Better Livelihoods**

The relatively stronger incomes, benefits, and opportunities provided by jobs that require STEM-related skills can bolster the economic progress of women and their families.

**Female Empowerment**

STEM jobs offer women and girls the tools of economic empowerment that are more generally held by men – including the confidence, qualifications, and ability to participate in fields where the pay is good and the demand for skilled labor is high.

**Innovations**

Without meaningful participation of women, STEM innovations are unlikely to reach their full potential, because they lack the insights and experience that women bring.
Women in STEM

Facts & Figures

- 28% of STEM workforce
- 21% of engineering majors
- 21% of computer science majors

- $15,000 wage gap between men and women
- $33,000 wage gap between men and Latina/Black women

Source: AAUW
Causes Behind the Gap

The gender gap starts at a young age due to...

- traditional stereotypes/biases
- discouragement/lack of confidence
- lack of female role models

Let's find out how we can tackle these problems!
**Causes/Solutions**

**CAUSE**
- The notion that men are better suited to STEM fields than women are remains a common belief
- Stereotypes linking science with men limit girls’ interests in science-related activities and careers
- Societal stereotypes impact the way women and girls are treated in the workplace and in school, decreasing their enjoyment and value when actually participating in STEM fields

**STRATEGIES**
- Create awareness of the harms: teach schools, instructors, etc to be objective
- Modify the classroom: change posters, texts, etc. to be more inclusive
- Early engagement: inspire girls that they can participate in any field such as STEM
- Spread the word: kids like working together, so let others know that you signed your daughter up for STEM
**Causes/Solutions**

**Disscourage**

**CAUSE**
- Students who view their cognitive abilities as fixed from birth are more likely to experience decreased confidence and performance.
- When faced with setbacks, they are more likely to give up.

**STRATEGIES**
- Emphasize a growth mindset: tell girls how far they can go by starting small.
- Teach that intellectual skills can be acquired: show that through passion, dedication, and self-improvement they can get smarter.
- Praise children for effort: value taking on challenges, learning & growth.
CAUSE

- Spatial skills are one of the most persistent gender gaps in cognitive skills (Linn & Petersen, 1985)
- Spatial skills are important for the success in fields like engineering or chemistry (used to interpret diagrams/drawings)
- Many girls dropout of engineering classes due to struggling in spatial skills, creating a sense that they don't belong

STRATEGIES

- Early learning of spatial skills: gender differences become pronounced later on in educational paths
- Emphasize growth mindset: spatial skills are developed
- Hands-on activities: taking things apart and then back together, using handheld models, playing games that involve fitting objects into different places, drawing
## Causes/ Solutions

<table>
<thead>
<tr>
<th>CAUSE</th>
<th>STRATEGIES</th>
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<tr>
<td>Girls have fewer role models to inspire their interests in these fields</td>
<td>More women role models: can help counter negative stereotypes</td>
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<td>Limited examples of female scientists/engineers in books, media, and pop culture</td>
<td>Accomplishment awareness: expose girls to the amazing achievements of other women</td>
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<td>Even fewer role models of Black women in math and science</td>
<td>Teach leadership: show girls they can take charge and be a leader rather than a follower</td>
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<td>Direct support for STEM education where representation is low: focus on minority, rural, disadvantaged communities</td>
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<table>
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<th>AGES 0-5</th>
<th>ELEMENTARY SCHOOL</th>
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<th>FIRST GRADE</th>
<th>MIDDLE SCHOOL</th>
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<td>The first five years of life are considered among the most formative. Brains “hard-wire” information in ways that impact how students perceive information throughout their lives (UNICEF, Facts for Life, 2010)</td>
<td>Early education and elementary school present a critical opportunity to promote interest and confidence among girls in STEM-related pursuits.</td>
<td>Girls have not been fully overwhelmed by discouraging stereotypes and media messages, and they remain relatively confident that learning presents for them as many opportunities as it does for boys.</td>
<td>As early as 1st grade, the perceptions of all children can become shaped by “implicit biases associating math with boys” (Corbett, 2015)</td>
<td>Gender differences in self-confidence in STEM subjects begin in middle school and increase in high school and college, with girls reporting less confidence than boys do in their math and science ability. (Pajares 2005)</td>
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Other Teaching Methods

Do rather than be: girls are more engaged when they are told they are "doing science" rather than "being scientists"

**LEARNING ENVIRONMENT**
Create personalized learning environments with a variety of media, approaches, etc
Emphasize learning rather than memorization

**CURRICULA**
Engage a variety of sources and perspectives
Apply hobbies into STEM
Emphasize real-life applications

**MENTORSHIP**
Work with girls through small groups or mentoring
Help them build confidence and resilience
Sources

https://www.aauw.org/resources/research/the-stem-gap/
https://www.edutopia.org/article/50-years-children-drawing-scientists
https://www.edutopia.org/article/keeping-girls-stem-3-barriers-3-solutions
https://www.edutopia.org/blog/5-ways-girls-involved-STEM-karen-purcell
https://spectrum.ieee.org/the-institute/ieee-member-news/6-things-that-can-help-propel-girls-in-stem

*note* parts of this presentation are a compilation of direct quotes from the sources