TEAM SMART GIRLS HQ

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Discussion Points

Current State of the STEM Workforce
Why Close The STEM Gender Gap?
What We Know About Girls And STEM
Influential Perceptions About STEM And How To Change Them
Dear Smart Girl Kit Activity Session Breakouts
BUT FIRST, A LITTLE ABOUT ME...

- Early STEM Influences
- First Exposure to Technology As A Career Path in HS
- Bias towards real world applications of technology
- 13 yr career in manufacturing solving business problems with technology
- 2 Daughters (aged 9 & 6)
Women are key participants in the labor market representing 57% of bachelors degree holders, 60% of masters level degrees and 48% of the workforce.

Except for with STEM Careers where they only represent 25% of the workforce. There haven’t been significant growth in participation since the early 2000s.

Women in STEM have a bias toward physical and life sciences.
Why Does This Matter?

1. **STEM Talent Shortage**
   According to the Manufacturing Institute, over the next decade nearly 3.5M* manufacturing jobs will need to be filled and the skills gap is expected to result in 2M jobs going unfilled.

2. **Economic Advantage**
   While women in the general workforce only make .73c to a man’s $1, women in STEM actually make two thirds more than non-STEM workers including men. Also, women are 60%** more likely to be the head of household; a higher earning power goes a long way.

3. **Diverse Perspectives**
   STEM enabled innovations are often life changing. Women participating in solving problems, particularly those that impact them directly, allow for brilliant ideas and discoveries that haven’t been considered before.

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*The skills Gap in US Manufacturing 2015 and beyond, Deloitte and The Manufacturing Institute

**Organization for Economic Co-operation and Development
What Do We Know About Girls And STEM?

MYTHS VS FACTS
### MYTH VS FACT: GIRLS ARE NOT INTERESTED

#### MYTH #1: Girls Are Not Interested In STEM

74% of teen girls say they are somewhat to very interested in STEM.

Data source: Generation STEM, Girls Scout Org

<table>
<thead>
<tr>
<th>% WHO AGREE...</th>
<th>STEM</th>
<th>NON-STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>I like to understand how things work.</td>
<td>87</td>
<td>65</td>
</tr>
<tr>
<td>I like puzzles and solving problems.</td>
<td>85</td>
<td>70</td>
</tr>
<tr>
<td>I like doing hands-on science projects.</td>
<td>83</td>
<td>56</td>
</tr>
<tr>
<td>I like asking questions about how things work and finding ways to answer them.</td>
<td>80</td>
<td>54</td>
</tr>
<tr>
<td>I like to understand how the natural world works.</td>
<td>79</td>
<td>57</td>
</tr>
<tr>
<td>I like building things or putting things together.</td>
<td>67</td>
<td>47</td>
</tr>
<tr>
<td>I like to understand how things are built.</td>
<td>66</td>
<td>47</td>
</tr>
<tr>
<td>I like doing math problems.</td>
<td>65</td>
<td>32</td>
</tr>
<tr>
<td>I think it would be fun to create an iPhone app or design a computer/video game.*</td>
<td>62</td>
<td>57</td>
</tr>
</tbody>
</table>
MYTH VS FACT: GIRLS ARE NOT INTERESTED

MYTH #2: Girls Are Not Built For The rigor of STEM

90% of teen girls believe if they try hard at something, they will succeed.

Data source: Generation STEM, Girls Scout Org

<table>
<thead>
<tr>
<th>% WHO AGREE...</th>
<th>STEM</th>
<th>NON-STEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Whatever boys can do, girls can do.</td>
<td>97</td>
<td>91</td>
</tr>
<tr>
<td>If I try really hard at something, I know I will succeed.</td>
<td>95</td>
<td>88</td>
</tr>
<tr>
<td>I'm a hard worker.</td>
<td>93</td>
<td>87</td>
</tr>
<tr>
<td>When someone tells me I can't do something, I try to prove them wrong.</td>
<td>94</td>
<td>89</td>
</tr>
<tr>
<td>Obstacles make me stronger.</td>
<td>91</td>
<td>85</td>
</tr>
<tr>
<td>I get frustrated if something is too hard.</td>
<td>79</td>
<td>86</td>
</tr>
<tr>
<td>I try to pursue things I'm naturally good at and avoid things that are hard for me.</td>
<td>66</td>
<td>79</td>
</tr>
</tbody>
</table>
BURSTING THE MYTH: A Case Study

Our Smart Girls Squad Program at Dorothy J Vaughn Academy of Technology, Charlotte, NC
Rebranding STEM for Girls
MYTH VS FACT: GIRLS ARE NOT INTERESTED

PERCEPTION #1: STEM IS NOT CREATIVE

Most girls identify themselves as creative but don't think STEM jobs allow for creativity.

% of girls (Grades 5 - 12) that think people in these STEM jobs get to be creative at their Job

COMPUTER SCIENTIST
44%

ENGINEER
49%

MATHEMATICIAN
19%

Data source: Closing The STEM Gap, Microsoft
REALITY: STEM + CREATIVITY ENABLES INNOVATION

How Can We Change Perceptions?

- Make STEM learning practical + interactive
- Demystify making
- Connect the dots from real world innovations and STEM contributions

"When I was in lower grades, it was pretty fun to do activities in science. When I got to 6th grade, we just had to do book work and question. Science wasn't my favorite anymore."
- preteen girl

Data source: Closing The STEM Gap, Microsoft

<table>
<thead>
<tr>
<th>Job</th>
<th>Change in Perception (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPUTER SCIENTIST</td>
<td>+17%</td>
</tr>
<tr>
<td>ENGINEER</td>
<td>+14%</td>
</tr>
<tr>
<td>MATHEMATICIAN</td>
<td>+24%</td>
</tr>
</tbody>
</table>

% of girls (Grades 5 - 12) that think people in these STEM jobs get to be creative at their job after hearing a brief description of real world accomplishments.
PERCEPTION #2: STEM IS NOT IMPACTFUL

For most girls, Engineering and Technology career paths are perceived not to align to their goals of helping people and making a difference in the world.

TOP 5 IMPORTANCE IN CHOOSING A CAREER PATH

- Helping people
- Making a difference in the world
- Helping those who are less fortunate
- Having input into how the job is done
- Making a lot of money

TOP 10 INTERESTED IN PURSUING...

- Medicine/Healthcare
- Arts/Design
- Social Science
- Entertainment
- Communications/Media**
- Physical/Life Sciences
- Community/Social Services**
- Education*
- Business/Finance
- Law

If you think about teachers, everyone knows about teachers as a career, but not everyone our age really thinks about engineering. They don't know all that much about it.

- Preteen girl

Data source: Generation STEM, Girls Scout Org
REALITY:
STEM SOLVES REAL WORLD PROBLEMS

How Can We Change Perceptions?

- Go beyond "Hello World"
- Corporations should connect young people to their "Why" and "How"

Nearly two-thirds of women who work in STEM fields (64%) and tech (65%) feel that the work they do makes a difference in the world. This is 7 and 8 points higher than working women overall (57 percent).

Data source: Closing The STEM Gap, Microsoft
When asked to describe a typical scientist, engineer, mathematician, or computer programmer, 30 percent of girls say that they envision a man in these roles. As do almost 40% of adult women -- and 43% of women in STEM and tech fields.
REALITY: WOMEN ARE THRIVING IN STEM

How Do We Change Perceptions?

- Be persistent in showing female representation in STEM
- Go Beyond Traditional "Hero" Roles
- Corporations should engage girls earlier than college

Majority (57%) of the women in Tech report that their employers made a strong effort to make an inclusive work environment.

Data source: Closing The STEM Gap, Microsoft
CommonBond survey, Forbes
PERCEPTION #4:
STEM IS EASIER FOR BOYS

By Age 6, Girls think they are not as smart as their male peers.

Data Source: ROX Inc, Girls Inc
REALITY:
STEM IS HARD FOR EVERYONE

Women would make up 37% of the STEM workforce rather than only 25% if they persisted at equal rates to men after Calculus 1.

Data Source: Research paper. Dr Ellis, Fr Bailey and Dr Rasmussen
REALITY CONT'D:

How Do We Change Perceptions?

- Early Exposure is critical
- Enrichment and support are necessary
- Create STEM Advocates in schools and at home
- Stop Teaching Our Girls To Be Perfect
Girls start off very interested in STEM but lose interest over time due to unfavorable perceptions about STEM.

These perceptions can be changed through specific actions.

**4 Actions to Take to Better Engage Girls in STEM**

- **Connect the dots** between innovation, creativity and STEM through practical learning experiences.
- **Show STEM Impact** by engaging her in why and how your products or services make a difference in the world around her.
- **Make role models more visible**, work places more inclusive, and her path to career clearer.
- **Empower her to stick with it**; enrich her learning in ways that bring STEM to life.
IT TAKES A VILLAGE ...
Let’s Work Together To Create Pathways For Girls To Succeed At STEM

SMART GIRLS HQ
Our mission is to increase female participation in the STEM talent pipeline for K–12 girls. We do this in partnership with ...

PARENTS:
by providing content, tools, and resources that empower them to inspire and sustain STEM interest beyond the classroom.

EDUCATORS:
To create learning tools that bring STEM to life and help connect the dots to STEM career paths.

CORPORATIONS:
To connect girls in the communities they serve to the positive impact of their products and services and to the STEM careers that help make it happen.

RAISING SMART GIRLS.COM
Online Destination for Parents of Girls
Highly adaptive digital library of editorial content, tools, and resources. We aim to help parents of girls aged 3 to 12 develop competence, confidence and character.

Personalized Service
An app that uses artificial intelligence to deliver just-in-time recommendations of STEM inspired resources that match their daughter’s unique interests.

Offline STEM Experiences
Local hands on interactive sessions that engage girls in maker fun that is inspired by their interests and connects to dots to real life career paths.

Join our community of over 20k Parents on Facebook and Subscribe to our weekly newsletter at RaisingSmartGirls.com

abismartgirlsHQ.com  Abi Olukeye  /raisingsmartgirls  @smartgirlshq
Dear Smart Girl

Design and light up a headband with parallel circuits!

Warning: Choking hazard - small parts not for children under age 3
What is electricity?

- To make electricity, you must have **electrons**
- Electrons are a tiny charged part of an atom
- When a stream of electrons move through a conductor, you get electricity.
- A conductor is anything that allows the flow of electrons to go through it.
- Materials such as copper metal that allow electricity to flow through them readily are **conductors**, others like plastic and rubber that don’t are called **resistors**.

Fun Fact: Back in the days, people used to think electricity was a kind of fire.
What is a circuit?

- Electrons have to travel and they do so in an electrical circuit kind of like running around on a circular track.
- The path of a circuit has to end where it started with no gaps. This is called a closed circuit.
- If there is a gap, the electrons can’t continue so the circuit is broken. This is called an open circuit.
- Electric current provides energy to power lots of things in our daily lives, from microwaves to your phone.

Fun fact: The word circuit comes from the Latin circuitus, which means to go around
Understanding our Light Up Headband Circuit

**Lithium Battery**
Low volt battery. Safe for experimentation.

**Lily Pad**
Battery holder with conductive surface area

**Conductive Thread**
Thread that can carry current the way wires do.

**Light Emitting Diodes (LEDs)**
A light source that emits when current flows through it.
Longer legs: positive
Shorter legs: negative
Understanding our Light Up Headband Circuit

The thread and the surface area on the lilypad act as **conductors**. It also has a **circuit breaker** to turn the light on and off.

The **battery** is our power source. **LEDs** are our light source.