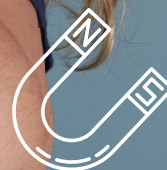


# Keeping Doors Open

Girls, STEM & Their  
Future Careers

2020



## INTRODUCTION

**When it comes to STEM, we have a long way to go to balance the equation for girls' and women's participation. Girls continue to receive messages that STEM isn't for them and may be closing the door on STEM careers as early as Grade 8. As a result, girls could be limiting their career potential and pathways, particularly as the economy and workplace evolves. And as a society, we could be missing out on generations of future innovators and problem-solvers.**

Science, technology, engineering and math (STEM) are fields that open a world of possibility. Professionals in these fields are at the forefront of tackling many of the biggest challenges facing humanity: from disease, to climate change, to clean drinking water access and more. Many innovative, analytical, and creative people find meaningful work in these fields. Not only that, but we know that STEM skills and careers will be foundational in the future economy.

And yet it's not news that STEM is an area where girls and women are still sorely underrepresented.

This underrepresentation doesn't happen all at once – it happens as girls and women drop off at every step along the path toward STEM educational and careers fields, something often referred to as the “leaky pipeline.”

As an organization focused on supporting girls to be everything they want to be, Girl Guides of Canada (GGC) decided to research girls and STEM. We wanted to understand what getting into the STEM pipeline looks like for girls under age 18 – well before they enter post-secondary studies – and why so many are not pursuing opportunities in these fields. We want to ensure that girls have equitable access to high-earning and high-skills jobs – both today and in the future – and that they have the knowledge and tools to make informed decisions about their education and future careers.

*“At each step along the education stream, fewer and fewer young people choose to study science or engineering, and the drop-off for girls and women is considerably larger than that for boys and men.” – Natural Sciences and Engineering Research Council of Canada<sup>1</sup>*



## What did we learn?

**Girls might be prematurely closing doors to STEM for three main reasons:**

**1. Girls continue to receive messages that STEM isn't for them.** Influences from parents, peers, teachers, media, and society at large continue to subtly – and not so subtly – tell girls that they shouldn't (or can't) be interested or succeed in STEM subjects.

**2. Girls may not be aware of the steps they need to take to open certain doors.** In many cases, girls need to start making decisions as young as age 13 that can impact their ability to pursue STEM fields in the future. But they might not be equipped with enough information to make informed decisions at this early age.

**3. Girls may not realize many of the doors even exist.** There are a wide variety of STEM fields and entry points into those careers, many of which girls may not be aware of. We know that girls are often interested in careers that help people, make the world a better place, and that allow them to be creative, but often aren't aware this is possible through STEM.

Together, these three factors create an environment in which girls are making decisions at the same time that they're being unfavourably influenced by others in their lives in ways that are detrimental to their pursuit of a future in STEM. Empowering girls to navigate to the STEM pipeline is about supporting them to make informed decisions about education and careers so that they don't close doors prematurely. It's also about debunking harmful norms and stereotypes about what girls can do.

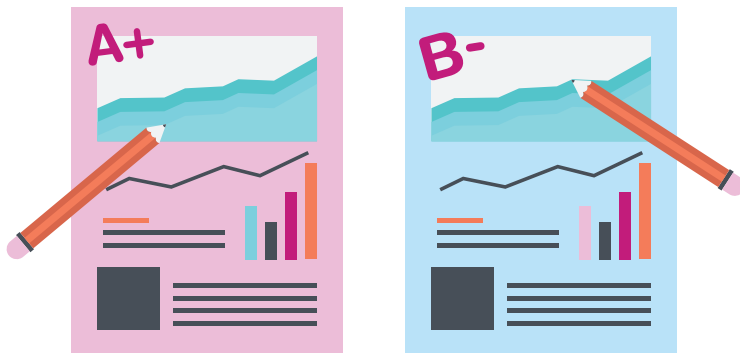




## By the numbers: women and girls in STEM

### A round-up of the latest facts from Canadian research on women and girls in STEM:

Girls with higher mathematics marks in high school are less likely to opt for a STEM university program than boys with lower marks.<sup>11</sup>



As first-year undergraduate students, women make up:



**63.8%** of non-STEM programs



**56%** of science and science technology programs



**27.6%** of mathematics and computer and information science programs



**19%** of engineering and engineering technology programs<sup>12</sup>

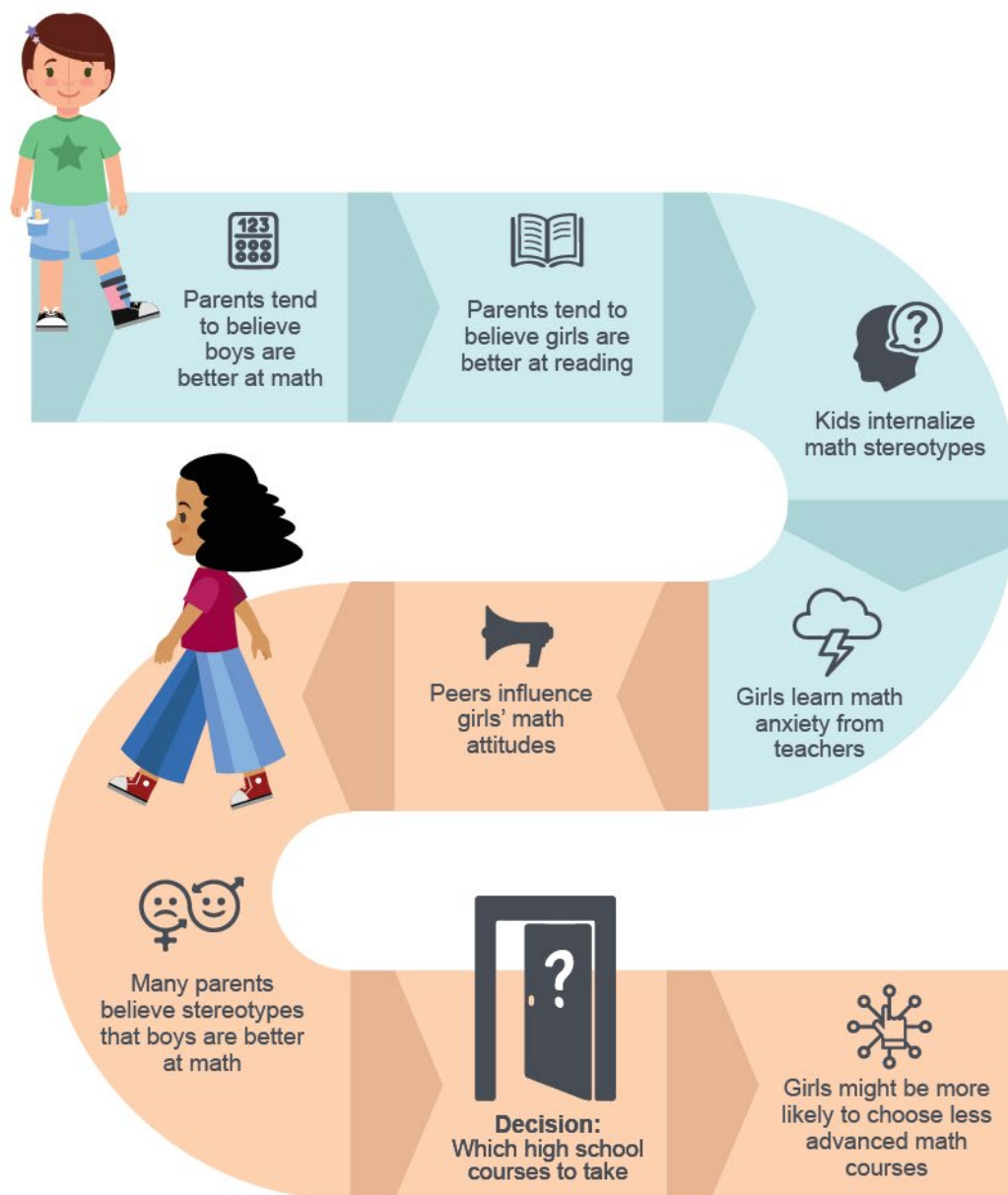


- Indigenous students account for only 1.2% of undergraduate enrolment in engineering programs,<sup>13</sup> and Indigenous men are twice as likely to graduate from a STEM program as Indigenous women.<sup>14</sup>
- Women represent 59% of all university graduates, but they only account for 39% of graduates from STEM programs.<sup>15</sup>
- 18% of women STEM graduates are in occupations requiring a high school diploma or less.<sup>16</sup>
- A longitudinal study found only 3 in 10 women STEM graduates were employed in a STEM field, versus 4 in 10 men graduates.<sup>17</sup>
  - Racialized women were even less likely to persist in STEM fields.
- Women made up only 18% of newly-licensed engineers in 2018.<sup>18</sup>
- Black, Filipina, and Indigenous women are much less likely than other groups to participate in the tech sector.<sup>19</sup>



# GETTING TO THE PIPELINE

## What getting to the STEM pipeline looks like for girls



### CHILDHOOD Ages 5 - 12

In childhood, parents tend to believe that boys are better at math and girls are better at reading.<sup>23</sup> Kids begin to internalize gendered stereotypes about math.<sup>24</sup> In elementary school, teachers' math anxiety is imparted onto girls, but not boys, and impacts girls' math achievement.<sup>25</sup> At this point, parents believe that math is more difficult for girls than for boys.<sup>26</sup>

### ADOLESCENCE Ages 13 - 14

In adolescence, parents of girls hold stronger gender stereotypes favouring boys in math.<sup>27</sup> In grade 8 or 9, girls have to make critical decisions about high school courses. They're supported by parents, teachers, and guidance counsellors as they make these choices. Girls in Grade 9 might be more likely to take less advanced math rather than the advanced course despite otherwise being on the advanced academic track.<sup>28</sup>







**Decision:**  
Which math and science courses to take



Peers influence girls' post-secondary choices

Girls with higher math marks less likely to choose STEM programs than boys with lower marks



## ADOLESCENCE Ages 14 - 18

In high school, peers influence girls' math attitudes and choices for post-secondary programs.<sup>29</sup> Girls view themselves as hardworking rather than smart when it comes to STEM classes.<sup>30</sup> Girls in Grades 10 and 11 need to decide which math and science courses they take. In Grade 12, they need to make critical decisions about the post-secondary programs they apply to and enter. Girls with higher math marks are less likely to choose STEM university programs than boys with lower marks.<sup>31</sup>



**Decision:**  
Entering post-secondary programs



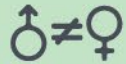
**Decision:**  
Post-secondary applications



Girls see themselves as hardworking – not smart – in STEM



Women twice as likely to switch from STEM to non-STEM



Sexism and gender-based harassment at school



**Decision:**  
Staying in program of study or switching

## POST-SECONDARY Age 18+

In post-secondary studies, women are twice as likely to switch from STEM to non-STEM programs in the first two years.<sup>32</sup> More than half of post-secondary graduates are women, but women are the minority of STEM graduates (39%). And they're more likely to be graduating from science and technology (59%) compared to engineering (23%), math (30%), and computer science (30%).<sup>33</sup>



Women with STEM degrees have higher unemployment rates



Women are 39% of STEM grads



Women less likely to graduate from engineering, math, and computer science



Sexism and gender-based harassment at work



Women with STEM degrees more likely to have skills mismatch at work



**Decision:**  
Career path

## EARLY CAREER Age 22+

Women with a STEM degree have a higher unemployment rate and are more likely to be in a job that doesn't match their skills, as compared to men. Women work in STEM fields with lower median wages.<sup>34</sup>

