



NATIONAL INSTITUTE FOR  
WORK & LEARNING

# Science, Technology, Engineering, Mathematics, Manufacturing, and Design (STEM<sup>2</sup>D)

NIWL CAPABILITIES IN STEM EDUCATION

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**fhi**  
**360**  
THE SCIENCE OF  
IMPROVING LIVES

# CHANGING THE REPRESENTATION OF MARGINALIZED GROUPS IN THE STEM WORKFORCE

## STEM Workforce

Science, Technology, Engineering, and Mathematics (STEM) is an increasingly important sector of studies and the U.S. economy. By 2028, STEM occupations are expected to increase 8%, creating more than 8.6 million new jobs, according to the Bureau of Labor Statistics. This is great news for the next generation of workers who will qualify for these jobs, many of which have a median annual wage of nearly \$76,000—more than double the \$35,080 median wage for all workers. But it's not such great news for women and underserved populations who are underrepresented in STEM education and careers. Over 57 percent of professional workers in the U.S. are women, and yet women represent only 24% of science professionals and 3% of Nobel Prize winners. African Americans and Hispanics have been consistently underrepresented in STEM employment. In 2011, only 6% of the STEM workforce was African American, and 7% were Hispanic (US Census Bureau). In addition, in 2015, 9% of employed scientists and engineers in 2015 were people with disabilities (National Science Foundation).



### ABOUT FHI 360

FHI 360 is a nonprofit human development organization dedicated to improving lives in lasting ways by advancing integrated, locally driven solutions.

## Our Commitment

NIWL is committed to growing the number of women and members of underserved communities working in STEM. Our commitment is guided by three core values: start early, focus on equity, and engage employers in planning and preparation.

## Curriculum Development

NIWL 360 works to level the playing field for girls and underserved populations by developing equity-based curricula, grounded in research, for use in school, afterschool and other informal settings. Our curricula combine the principles of STEM (Science, Technology, Engineering, Mathematics) with Manufacturing and Design (STEM<sup>2</sup>D). The curricula span pre-K through elementary, middle, and high school. All curricula stress parent and adult involvement, which has been shown to be an important factor in children's success. Our informal *STEM<sup>2</sup>D Student Activity* series are designed to enable young people to identify as STEM enthusiasts and future members of the STEM workforce, while avoiding the traps of stereotypes and misconceptions that have resulted in an unbalanced workforce. We provide training, coaching and technical assistance to test and refine these curricula and student activities, and then create easy-to-use implementation guides that allow them to be delivered on a large scale. They are available in more than six of the most common languages spoken across the world.



Table 1. Key Curricular Products

Product	Description
<b>STEM<sup>2</sup>D Student Activities Series</b>	Provides basic information on the organization, logistics, and format of the STEM <sup>2</sup> D student activities. It can help you choose the right activity – based on expertise and background, the age of the youth, the materials required, and the time available.
<b>STEM<sup>2</sup>D Student Activities</b>	More than 25 interactive and fun, hands-on activities for secondary school students, ages 12-18; activities are one to four hours in length and focus on one or more of the STEM <sup>2</sup> D subjects.
<b>IGNITE! STEM<sup>2</sup>D Activities</b>	Short, introductory hands-on activities introduce students to the endless opportunities in STEM <sup>2</sup> D. IGNITE! activities are intended for use at career fairs, science fairs, exhibits, any type of booth, or as an ice breaker.
<b>Activities at Home</b>	Short video clips and tip sheets highlighting STEM <sup>2</sup> D activities that parents, and girls can complete at home or outside of school using everyday materials.
<b>STEM<sup>2</sup>D Career Quiz</b>	This online quiz ( <a href="http://www.ExploreSTEM2D.fhi360.org">www.ExploreSTEM2D.fhi360.org</a> ) will help girls explore their interests and passions and how a career in STEM <sup>2</sup> D can make a difference in the world.

## Employer Engagement and Employee Training



NIWL engages employers who are invested in nurturing the future STEM workforce to inspire and support girls and young women, and other underrepresented populations, in exploring STEM careers. We develop and test research-based volunteer guides for STEM professionals, deliver on-site training and technical assistance, support STEM internship opportunities, and champion success stories of women and girls in STEM fields. For example, through our partnership with Johnson & Johnson and its WiSTEM<sup>2</sup>D (**W**omen in **S**cience, **T**echnology, **E**ngineering, **M**athematics, **M**anufacturing, and **D**esign) global initiative, we trained and equipped more than 2,000 Johnson & Johnson Volunteers in 31 countries with the tools needed to successfully engage young people in hands-on activities that spark an interest in STEM.

**Table 2. Employee Resources and Training Activities**

	Activities and Products
<b>RESOURCES</b>	<p><b>SPARK!</b> Promotes the valuable involvement of volunteers to inspire STEM<sup>2</sup>D subjects and 21st-century careers around the world.</p> <p><b>Playbook:</b> Provides detailed information through 8-Quick Steps for how to get started with planning STEM<sup>2</sup>D events, forge connections, plan effective events, share successes, obtain existing resources, and get the most out of the volunteer experience.</p>
<b>TRAINING &amp; PROFESSIONAL DEVELOPMENT</b>	<p><b>e-Modules:</b> 10-15-minute, topic specific e-Modules will help volunteers enhance their knowledge and skills in working with youth.</p> <p><b>Virtual Workshops-Modules:</b> 30-45-minute, topic specific sessions for how to plan STEM<sup>2</sup>D events.</p> <p><b>One-on-One Training Sessions:</b> 60-minute interactive sessions to help plan STEM<sup>2</sup>D events.</p>

## Building Strong Programs through Research and Evaluation



NIWL team of research and evaluation specialists conduct rigorous formative studies of our own STEM programs and curricula to build an evidence base for excellent STEM preparation. We also lend our expertise to external program evaluations and research studies that help to define the best in STEM learning. We produce research and position papers to help galvanize the movement toward early, equity-based learning. Our activities through the WiSTEM<sup>2</sup>D Youth Pillar project shows that 31 countries implemented programs to engage women and girls in STEM<sup>2</sup>D and 2000 plus Johnson & Johnson employee volunteers engaged in inspiring girls in STEM<sup>2</sup>D, reaching more than 6 million girls with the STEM<sup>2</sup>D tools and resources. Some of these implemented activities are highlighted in our recently published *A Commitment to Catalyzing Change: Case Studies of WiSTEM<sup>2</sup>D Implementation in 2019*.

### ABOUT NIWL

As part of FHI 360's U.S. Programs, NIWL works at the nexus of education and employment systems, promoting their integration to ensure lifelong learning and productive work for all. NIWL seeks to build the capacity of public and private organizations, providing information, resources, and support needed to make decisions, strengthen programs, and improve outcomes for individuals.

**Table 3. Women in STEM<sup>2</sup>D 2015-2019 Outcomes**

OUR OUTCOMES	
300+	WiSTEM <sup>2</sup> D events
7.5 Million	Students Reached
6 Million	Girls Reached