# THE RISE OF STEM IN SCHOOLS

Over the last decade, the U.S. has seen nearly **2 MILLION NEW STEM JOBS** but students' math and science scores continue to lag behind other nations*

**HOW CAN SCHOOLS BETTER PREPARE THEM WITH BADLY NEEDED STEM SKILLS?**

*According to the International Math & Science Study (TIMSS)

## WHAT IS STEM?

**S**CIENCE · **T**ECHNOLOGY · **E**NGINEERING · **M**ATH

Coined in 2001 by Judith Ramaley, Assistant Director of Education & Family Resources at the National Science Foundation (NSF).
Since then, STEM-focused curricula have extended around the world

## IN 2005, "RISING ABOVE THE GATHERING STORM" WAS RELEASED BY THE NATIONAL ACADEMIES OF SCIENCES AND ENGINEERING, AND THE INSTITUTE OF MEDICINE

**Argued U.S. students were academically behind** in STEM achievements

The same year, American 8th graders placed 12th in math and science skills* – behind Singapore, Japan, Taiwan, South Korea, and Hong Kong

*According to the International Math & Science Study (TIMSS)

**Predicted dire economic consequences** of a poorly prepared workforce

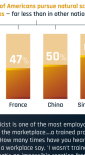
At the time, the U.S. patent office granted more patents (57%) to foreign nationals and foreign companies than to Americans

**Reflected a newfound focus on STEM careers and curriculum**

## WHY IS STEM ESSENTIAL?

of Americans believe that increasing STEM-trained workers is **vital to maintaining the nation's place in the global economy**

Just **15% of Americans pursue natural science degrees** – far less than in other nations




"We go where the smart people are. Now our business operations are two-thirds in the U.S. and one-third overseas. But that ratio will flip over the next 10 years."

**HOWARD HIGH**
CHIEF SPOKESMAN FOR INTEL

"A physicist is one of the most employable people in the marketplace…a trained problem solver. How many times have you heard a person in a workplace say, 'I wasn't trained for this!' That's an impossible reaction from a physicist, who would say, instead, 'Cool.'"

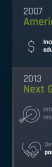
**NEIL DEGRASSE TYSON**

**Raising a STEM workforce starts long before college – Where do schools begin?**

## STEM 101

### HOW STEM BUILDS SKILLS

STEM is an ever-evolving and expanding field – success requires the ability to continue to **learn and adapt to new situations**



Activities present engaging materials for hands-on learning

PROJECT-BASED LESSONS HELP BUILD SOFT SKILLS, LIKE:

- Creativity & innovation
- Problem-solving & critical thinking
- Collaboration & leadership

"Making (something) highlights relationships. You don't have to know everything… you use the resources of the community."

**LISA BRAMMS**
Director of Learning and Research at the Children's Museum of Pittsburgh

## HISTORY OF STEM IN THE CLASSROOM

### 2007 America COMPETES Act

- **Increased funding for STEM education** and research programs
- Most of the funding went to **NSF scholarships for STEM teachers**

**Today, 7% of students in the U.S. students have a science curriculum influenced by NOSS**

### 2013 Next Generation Science Standards (NGSS)

- Internationally benchmarked, research based **learning targets**
- Developed through a **wide-ranging partnership, including**
  - The National Academies of Sciences, Engineering, & Medicine
  - The National Science Teachers Association
  - The American Association for the Advancement of Science
  - State-level representatives and other stakeholders

**Obama called bipartisan support for the bill a "Christmas miracle"**

### 2015 Every Student Succeeds Act (ESSA)

- **Increased federal funding** for K-12 STEM, including
  - Activities, after-school programs, and field trips
  - Professional development and teaching materials
  - Specialty schools and magnet programs
- Established **STEM Master Teacher Corps**
- **Added computer science** as a core subject

**Today's high school graduates** are some of the first to go through all of K-12 education with a **focus on STEM**

## IS STEM WORKING?

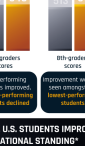
### TEST RESULTS ARE MIXED

From 1995 to 2015, U.S. students*

Improved their **math skills** significantly*

Both high- and low-performing students showed **improvement**

But, **science scores** weren't as promising




Low-performing students improved, but **high-performing students declined**

improvement was only seen amongst the **lowest-performing students**

*According TIMSS

### FROM 2015 TO 2018, U.S. STUDENTS IMPROVED THEIR INTERNATIONAL STANDING*

*According to PISA

In 2015, 10th-grade students ranked

**#35** MATH
**#17** SCIENCE

In 2018, 10th-grade students ranked

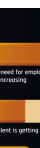
**#30** MATH
**#11** SCIENCE

But, actual scores have remained **stagnant for over a decade**

### MORE GRADS CHOOSE STEM

**Growth** of undergraduate in STEM from 2010-2015

**3 IN 4** college grads majored in STEM-related fields in 2018




of high school graduates plan to **pursue a STEM career**

BUT, With 8 of the 10 fastest-growing jobs in STEM, **2.4 million positions still went unfilled in 2018**

### THE CRISIS ISN'T OVER

More than **HALF OF U.S. PATENTS** still go to foreign nationals and foreign companies

The U.S. remains a net importer of high-tech products

of employers say their need for employees with technical skills is increasing

say finding the right talent is getting harder

As technology grows, specific skills become obsolete – **the ability to adapt, learn, and solve problems will be the future of the STEM workforce**

**GROW YOUR ABILITY TO "LEARN BY DOING" AND YOUR SKILLS WILL NEVER BE OBSOLETE**


SOURCES

nsf.gov/nsb.org/About.aspx
nsf.gov/statistics/nsf13300/pdf/tb1300.pdf
nextgenscience.org/PlayofPurpose
nces.ed.gov/pubs2017/2017883.pdf
nces.ed.gov/programs/coe/indicator_cnc.asp
bls.gov/opub/mlr/2017/art2full_20170601.htm
nsf.gov/statistics/seind14/content/chapter-5/chapter-5.pdf
nsf.gov/statistics/seind14/content/chapter-5/chapter-5.pdf#page=15
fullbloom.com/topic/STEM-education/STEM-education
benedict.org/wp-content/uploads/2018/08/1808WA-Lynd
everyonecounts.com/wp-content/uploads/2018/08/1808WA-Lynd
everyonecounts.com/wp-content/uploads/2018/08/1808WA-Lynd
benedict.org/wp-content/uploads/2018/08/report_2_1808WA-Wise-Lynd
nsf.gov/statistics/seind14/content/chapter-5/chapter-5.pdf#page=24
c3.org.uk/media/uploads/docs/NW-CC0Fs/STEM-policy-discover-the-challenge-inform.pdf
pewresearch.org/fact-tank/2017/03/15/u-s-students-internationally-math-science
pewresearch.org/fact-tank/2017/03/15/u-s-students-internationally-math-science
theatlantic.com/education/archive/2015/12/the-stem-crisis-is-a-hoax/420976
nsf.gov/news/news_summary_topic.jsp?cntn_id=100525