STEM in the Classroom and Beyond
Kansas City Region
July 31, 2015
Laura Loyacono, Executive Director
KC STEM Alliance
STEM occupations will create **2.6 million** U.S. jobs from 2010-2020.

- Net new jobs: 1,550,000
- Replacement jobs: 1,090,000
- Total jobs: 2,640,000

Source: KC STEM Alliance
By 2018, a larger percentage of jobs will require some post-secondary education:

Missouri: 59% = 1.8 million jobs
338,000 of those are STEM jobs

Georgetown’s Center on Education and the Workforce predictions for 2018
For most jobs, securing a high school education will not be enough to qualify for employment.

Applicants will need to have some form of post-secondary education:

- Bachelor’s Degree or beyond
- Some college/AA degree
- Certificate or certification in a field

Georgetown’s Center on Education and the Workforce: Recovery 2020
Elephant in the Room...

STEM

STEAM

STREAM

STEM A
Minorities make up less than 5 percent of the STEM-based workforce.

—U.S. Department of Labor, 2012 statistics
Only 3 in 10 African American students who have the potential to succeed in AP math actually take the course. Of those who don't take the class, half report that it is not available and the other half report lacking the confidence to take it.
No Girls, Blacks or Hispanics Took AP Computer Science Exam in Some States in 2013. In Missouri, only 12 out of 173 were Black.
Today, the majority of college graduates (57%) are women—and nearly half (48%) of this country’s workforce is comprised of women. Yet, women account for only 20% of bachelor’s degrees in engineering, computer science and physics.

Generation STEM, 2012 by Girl Scouts of the USA
68% of female respondents said a teacher or class got them interested in science, technology, engineering or math.
KC STEM Alliance’s approach to these issues...
KC STEM approach for Kansas City region

Enrichment
Field Trips, Mentors, Summer Camp

During the school Day
Project Lead the Way along side college Preparatory MATH AND SCIENCE

After-school programs
FIRST Robotics, Lego League
Perry Initiative for Girls
Orthopedic Surgery & Engineering

Source: KC STEM Alliance
Introduce a Girl to Engineering Day – Feb 2015
Girls Ignite
School-based events around enrollment
MO/KS State Pledges Announcement – January 2015

**MWM·MO**
Million Women Mentors® – Missouri
Advancing Women and Girls in STEM Careers Through Mentoring

**MWM·KS**
Million Women Mentors® – Kansas
Advancing Women and Girls in STEM Careers Through Mentoring
Encourage summer camp participation
Encourage Student-led STEM Organizations at School

[Logos of various organizations such as HOSA, TSA, DECA, SkillsUSA, Engineers Without Borders]
Participate in Hour of Code at your school

www.code.org
Connect with your local industry professional chapters.

Society of Women Engineers

Aspire • Advance • Achieve

National Institute for Construction Excellence

National Society of Black Engineers

Society of Manufacturing Engineers
Connect with your local post-secondary institutions – both public & private
Connect with your local non-profit STEM organizations

KANSAS CITY WOMEN IN TECHNOLOGY

KC STEM Alliance

WiSTEMM
Women in Science, Technology, Engineering, Mathematics, Medicine

tech SHEROES

SCIENCE PIONEERS

CoderDojo

The Black Family Technology Awareness Association of Kansas City
Girls in STEM (noun) /stem/
a strong, natural structure
that grows in order to give a
plant a fighting chance.

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E = mc²

KC STEM Alliance

visit kcestem.org
KC STEM Alliance Career Posters

CREATE YOUR OWN OPPORTUNITY

SUNITA DIXIT

SCIENCE | TECHNOLOGY | ENGINEERING | MATH

Dejon Slaughter is an engineering student at University of Missouri Kansas City pursuing degrees in Architecture, Science, and Technology. He is interested in civil engineering, structure design, and urbanism. Dejon is a member of the National Society of Black Engineers.

SCIENCE | TECHNOLOGY | ENGINEERING | MATH

SUNITA GUPTA

DCE

DEJON SLAUGHTER

AE

ARCHITECTURAL ENGINEER
Statewide Opportunities

MO STEM Equity Pipeline
MO Math & Science Consortium
MO Afterschool Alliance
MO Afterschool Network
Million Women Mentors – MO/KS
Preparing students for the global economy

PROJECT LEAD THE WAY

PLTW
Project Lead the Way: Metro Area

91%

In the 5-county Kansas City metropolitan area, Project Lead the Way programs exist in 26 districts, providing access to more than 91% of the student population in our region. (Jackson, Clay, Platte in Mo., and Johnson and Wyandotte in Ks.)

*Kansas City Area Education Research Consortium, October 2013*
Programs are dynamic, rigorous and emphasize creativity. They offer students real world problem solving and critical thinking skills.

They provide students with strong foundation and proven path to college and career success. Students are highly engaged and exposed to areas of study which they do not typically pursue in HS and MS.
PLTW Engineering – high school program

**Introduction to Engineering Design (IED)**
- 3D computer modeling software; study of the design process

**Principles of Engineering (POE)**
- Exploration of technology systems and engineering processes

**Aerospace Engineering (AE)**
- Aerodynamics, astronautics, space-life sciences, and systems engineering

**Biotechnical Engineering (BE) – Environmental Sustainability**
- Biomechanics, genetic engineering, and forensics.

**Civil Engineering and Architecture (CEA)**
- Students collaborate on the development of community-based building projects

**Computer Integrated Manufacturing (CIM)**
- Robotics and automated manufacturing; production of 3-D designs.

**Digital Electronics (DE)**
- Use of computer simulation to learn the logic of electronics

**Engineering Design and Development (EDD)**
- Teams of students, guided by community mentors, research, design, and construct solutions to engineering problems.
PLTW Biomedical Sciences—high school program

**Principals of Biomedical Sciences (PBS)**
- Investigate various health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases

**Human Body Systems (HBS)**
- Examine the interactions of human body systems as they explore identity, power, movement, protection, and homeostasis

**Medical Interventions (MI)**
- Investigate a variety of interventions involved in the prevention, diagnosis and treatment of disease as they follow the life of a fictitious family

**Biomedical Innovations (BI)**
- Design innovative solutions for the health challenges of the 21st century.
PLTW Computer Science – high school program

Introduction to Computer Science (optional starting course)

Computer Science and Software Engineering (CSE)
  – App development, visualization of data, cybersecurity, robotics & simulation

Computer Science Applications (CSA)
  – Integrating technologies across multiple platforms and networks

Simulation and Modeling (SAM) – semester course
  – Statistic, data analysis, collaboration, professional writing

Artificial Intelligence (AI) – semester course
  – Develop systems to solve real world problems, automated vehicles and computer vision

Cybersecurity (SEC) – semester course
  – Understanding and closing computational vulnerabilities

Computational Problem Solving (CPS)
  – Deliver a software solution to a real-world design problem
PLTW Gateway – middle school program
PLTW Launch – elementary school program
STEM Excellence Pathway Workshops

Source: KC STEM Alliance
"To transform our culture by creating a world where science and technology are celebrated and where young people dream of becoming science and technology leaders."

Dean Kamen, Founder
The Four Phases of FIRST

- Jr.FLL: Grades K-3 (ages 6-9)
- FLL: Grades 4-8 (ages 9-14)
- FTC: Grades 7-12 (ages 12-18)
- FRC: Grades 9-12 (ages 14-18)

FIRST: learning never stops building upon itself.
Competition – Union Station January 2015

Source: KC STEM Alliance
Competition – UMKC January 2015

Source: KC STEM Alliance
KC Engineering Zone – KC EZ

Source: Chuck Maples
What does it take to make real progress?

Collaboration
Great teaching
Inspired learners
Committed community
Give us a call or check out our website – www.kcstem.org