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Ten Unique STEM Schools That We Could All Learn From

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TEN UNIQUE STEM SCHOOLS THAT WE COULD ALL LEARN FROM

During the past few years, STEM education has become a common term in today's educational environment. The importance of integrated curriculum has been discussed for decades, yet the application of core curricular subjects such as math and science has been an elusive, somewhat intangible concept. Lack of qualified teachers in STEM content areas, lack of pre- and in-service training, poor facilities, and lack of school support are just of few of the reasons why STEM education has been challenged in adequately preparing students with 21st Century skills (Ejiwale, 2013). This paper will look at ten unique STEM programs and how these programs are addressing the deficiencies listed above and how education professionals could gain insight into how Technology & Engineering Education programs could possibly improve how STEM is taught.

ISSUES AND CONCERNS

Establishing what a "unique" STEM program consists of poses significant issues as the term has a biased interpretation based on the perspective of the evaluator. Although a fairly standard definition of unique is: "having no like or equal, unparalleled, incomparable; not typical, unusual; existing as the only one or as the sole example, single, solitary in type or characteristics" (www.dictionary.com, 2016), identifying programs with these features relies on an individual to interpret the information covered in the program and make a judgement as to whether the program is in fact unique.

Another concern with this study is defining the acronym "STEM". The term STEM was initially used by the National Science Foundation to shorten the four independent fields of science, math, engineering, and technology (Sanders, 2009). Sanders explained the acronym was ambiguous from the start. He went on to explain that adding the term integrative to the acronym implied the disciplines were interrelated and should be taught as such. For the purpose of this study, integrated will be used to define whether the program is indeed STEM. It was determined if any of the STEM disciplines were not represented at a school being examined, it would not be considered a candidate for this study.

In an article from Education Week, six characteristics were identified for a successful STEM lesson. These included rigorous, hands-on projects using teamwork and the engineering design process to solve real-world problems with potentially multiple correct answers (Jolly, 2014). Although this study is studying entire programs, several of Jolly's characteristics were used to determine if a school is unique/exemplary based on one or more of the following:

- The students obtain high test scores in math and science providing one indicator of rigor.
- The program utilizes project-based learning in real-world applications.
- The students have access to technology- and equipment-rich laboratories providing hands-on learning using tools, machines, software, and hardware.
- The program curriculum delivers STEM content differently from more traditional models.

- The school has an excellent web presence showing program curriculum and examples of student work/projects.
- The program uses personal knowledge of or recommendations by STEM professionals through direct observation of quality.

The unique characteristics noted above can also have the following negative aspects which should be noted for this study:

- Test scores may not indicate true STEM impacts. (i.e., only math and science advanced placement scores are measured).
- Although engineering is gaining some educational clout, technology is still associated with computer science or computer applications.
- Excellent web presence could be based on self-promotion or recruitment for the school.
- Award winning does not indicate the overall success of hands-on programs.
- Not all good STEM schools have a good web presence, or the sites lack specific information regarding STEM-related programs.
- Self-identification of programs could be biased.

The following websites were used to identify unique STEM schools based on the above criteria.

- ITEEA outstanding programs award winners and past winners (International Technology and Engineering Educator's Association, 2016).
- Google, search terms included were:
  - “award winning T&EE or STEM schools”
  - “unique T&EE or STEM schools”
  - “best T&EE or STEM schools”

While individual schools were retrieved by general searches, the “U.S. News and World Report, Best STEM Schools” report surfaced as a web site containing all of the other schools. The U.S. News website was used as a starting point for all of the schools listed in this report. The U.S. News report used several criteria for selecting the best STEM schools in the nation using the following criteria (Morse, 2016):

- Gold Winners for Best High School Nationwide
- Scores/Data on AP STEM tests
- STEM Achievement Index, based on max score of 100. Ninety-eight was the highest this year.

The following data was collected on the selected schools, if the data was available for the school on the U.S. News and World Report or the school’s website:

- Program Rigor (AP Coursework, STEM courses, Dual Credit)
- School Demographics (Ethnicity, Gender, Economics, Enrollment, Student/Teacher ratio)
- Location
- Type of School (Public, Private, Charter/Magnet)
- Type of Activities (Labs, Senior Graduation, Capstone)
- Student Activities/Clubs (TSA, Robotics, Science Olympiad, etc.)

- Other
- Photos.

UNIQUE SCHOOLS

Of the hundreds of websites viewed during the course of this research, the following ten schools were chosen. It should be noted the list is not exclusive and does not infer other STEM schools are not providing excellent instruction in STEM or that the schools chosen are superior to others. Based on the criteria listed before, ten schools were selected and will be highlighted in this paper. The order in which the schools are listed is not an indication of rank order; the order is random and simply provides an explanation of each of the school's unique traits. Following is an abbreviated list of the schools viewed in this paper and will be followed with a more detailed look at each school:

- Blue Valley Center for Applied Professional Studies (CAPS) in Olathe, Kansas
- High Technology High School in Lincroft, New Jersey
- Cazenovia High School in Cazenovia, New York
- STEM School Chattanooga in Chattanooga, Tennessee
- Stuyvesant High School in New York, New York
- Paradise Valley High School Center for Research in Engineering, Science and Technology in Gilbert, Arizona
- Thomas Jefferson High School for Science and Technology in Alexandria, Virginia
- Pittsburg High School Center of Applied Learning in Pittsburg, Kansas
- Downingtown STEM Academy in Downingtown, Pennsylvania
- Lakeview Technology Academy in Pleasant Prairie, Wisconsin
- Additional: George Nettles FlexSTEM 4th Grade Elementary Classroom in Pittsburg, Kansas.

Blue Valley Center for Applied Professional Studies (CAPS); Olathe, KS

Blue Valley's CAPS program is relatively new, established in 2010, and now serves about 680 juniors and seniors from the district's five high schools (Robertson, 2015). Only district demographic information was available and was not desegregated for the CAPS program. The school has six program strands which include: Bioscience; Business, Trade, and Media; Engineering; Human Services; Medicine and Healthcare; and Accelerator (Entrepreneur) (Blue Valley Schools CAPS, 2015).

The following are considered unique traits for the CAPS program (Blue Valley Schools CAPS, 2015):

- The school partners with over 240 businesses, enabling students to complete real world projects (Robertson, 2015). Students work in teams to bid on projects submitted by area businesses utilizing a three-step process.
    - STEP 1: Problem – Students are presented with a problem, ask questions of the owners and submit a proposal/bid for consideration. The business chooses an individual or team to complete the project.

  - STEP 2: Ideation – Individuals or Teams come up with a solution
  - STEP 3: Presentation – Students present the solution to the business owner for acceptance, modification, or rejection.

- Business ethics are required for being accepted into the program. Professional dress and attendance is required daily. The students must be able to provide his or her own transportation to the CAPS facility.
- All CAPS courses are eligible for college credit with several four-year institutions. CAPS students are eligible for the "Degree in 3" program, allowing them to graduate college in three years.
- Students have started multiple businesses in the CAPS program, examples include:

  - H. Browning – Developed and patented a new fuel cell engine.
  - B. Buescher, D. Wheeler, H. Browning – Developed and patented an armless crutch.

High Technology High School; Lincroft, NJ

High Tech High School was ranked number one in the country for STEM high schools based on the criteria listed above from U.S. News and World Report. The school serves approximately 286 students in grades 9-12 from surrounding schools, and has a student/teacher ratio of 13:1. The population is primarily Asian (52%) and White (47%) with 47% of the students being female. This magnet school is fairly affluent with economically disadvantaged students only comprising 1% of the population (U.S. News and World Report, 2016).

The Monmouth County District has five academies within the district, one of which is High Tech High School (High Technology High School, 2016). The school offers nine different courses in Engineering to include some PLTW courses: Introduction to Engineering Design; Computer Integrated Manufacturing; Computer Programming for Engineers; Principles of Engineering; Biological Engineering & Environmental Sustainability; Civil Engineering and Architecture; Computer Science and Software Engineering, Digital Electronics; and Engineering Design and Development. The school is considered unique based on the following:

- School has comprehensive laboratories for hands-on, project-based learning.
- Students MUST complete a STEM Project for graduation.

Cazenovia High School; Cazenovia, NY

Cazenovia High School is a public school comprised of approximately 666 students in grades 8-12, and has a student/teacher ratio of 13:1. Ethnicity is predominately white (95%) and 50% of the population is female. Economically disadvantaged students comprise 11% of the school's student body (U.S. News and World Report, Cazenovia High School, 2016).

The curriculum is comprised of six foundation courses and 11 technology-related courses, which include PLTW courses. The courses include: IED - Design & Drawing for Production; Computer Integrated Manufacturing; Digital Electronics; Principles of Engineering; Engineering Design & Development; Architectural Drawing; Architectural Drawing II; Materials Processing;

Communications; Video Communications; and Housing and Interior Design. The following describe the unique characteristics of the school (Cazenovia Central School District, 2016):

- School has highly advanced and comprehensive manufacturing labs.
- Students must complete advanced projects.
- Instructors are proactive in educating others online by providing free resources to teachers and students. (Available at http://chrisandjimcim.com/.)

STEM School Chattanooga; Chattanooga, TN

STEM School Chattanooga is a charter school educating 275 students in grades 9-12 with a student/teacher ratio of 15:1. The student population is primarily comprised of 35% black and 56% White, of which 37% are female. The school has an economically disadvantaged population of 49% (U.S. News and World Report, 2016).

The curriculum is significantly different than most schools in that it utilizes units of instruction for grades 9-11 and self-directed learning in the 12th grade. The coursework is a cooperative effort between instructors, as well as business and higher education partners. The following chart illustrates the scope and sequence for STEM School Chattanooga (Hamilton Country Department of Education, 2016):

9th Grade	**10th Grade**	**11th Grade**	**12th Grade**
6 Units • Leadership • Energy • Transportation • Gaming • Robotics • Medicine	4 Units • Hunter Museum • DCM • Volkswagon • Unum-Python Coding	Choose 1 PBL/Qtr *Quarter 1 - Collaboration* • CSCC Free Flyer • EPB Holiday Windows *Quarter 2 – Critical Thinking* • The Imagination Machine • Design Studio and Maker Space • FabLab DC Curriculum for Middle School Girls • Prosthetics Solution Design and Fabrication • Sporting Goods Store Promotion *Quarter 3 – Innovation* • Glass Street Community Bike Station • Home Design Using 3D Technology • Moon Pie Anniversary Container • Outdoor Classroom Design Project	Self-Directed *HIGH SCHOOL GIG TANK* Students define a STEM issue/problem, design a solution, develop a business plan which will use the solution, then pitch their business to potential funders.

- Portable Hydroelectric Power Station
- Rezli Professional Networking Web Design
- The Imagination Machine

Quarter 4 – Critical Thinking and Innovation

- Brave Bot for Erlanger Hospital
- Drone-Based GIS Analysis
- Pavilion Shelter Design Project
- Science On The Go
- Smart Garden Project
- Tennessee Aquarium Exhibit Design

STEM School Chattanooga uses a backwards planning and curriculum design as well as project/problem-based education in which teachers become facilitators in the classroom. All students must complete an advanced project where they create a solution to a problem, create a business plan, and then pitch the plan to investors who could possibly invest in their company. The students also have multiple technology clubs including ACE Club, Makers and Designers (MaD), Robotics, Soap Box Derby, TSA, and Think Space (Hamilton Country Department of Education, 2016).

Stuyvesant High School; New York, NY

Stuyvesant High School is a public school comprised of 3292 students in grades 9-12. The student/teacher ratio at the school is 22:1. The school ethnic population is primarily comprised of 73% Asian and 22% White, with 40% being female. Forty-seven percent of the school's population is considered economically disadvantaged. (U.S. News and World Report, 2016).

The school identifies its STEM program as Technology Education and is a very comprehensive program comprised of 19 different courses. The courses include: Technology Graphic Communications; Computer Technology; Digital Photography; Graphic Arts Communication; Introduction to Architecture; Introduction to Interior Design; Jewelry Design; Principles of Technology – Mechanisms; Robotics; Technical and Scientific Illustration; Video Production; Advanced Computer Technology: Networking; CISCO; Advanced Video Production; Advanced Woodworking; Architecture; Ceramics; Digital Electronics; Photography; and Robotics Engineering (Stuyvesant High School, 2016).

The students are required to complete one term of Technical Graphics, one term of Computer Science, and two terms of Applied STEM learning classes from the courses listed above. The school contains a Fab Lab in addition to all of the unit labs for courses above, where students complete the applied STEM learning projects. The students can also participate in multiple clubs including the Science, Technology, and Research (STAR) Club; Vex Club; Video Production Club; Photography Club; and 3D Club (Stuyvesant High School, 2016).

Paradise Valley High School Center for Research in Engineering Science and Technology (CREST), Gilbert, AZ

The CREST Center which is part of WEST-MEC (Western Maricopa Education Center) has 1771 students in grades 9-12 and has an 18:1 student/teacher ratio. The student body ethnicity is primarily comprised of 42% Hispanic and 46% White, with 47% of the students being female (U.S. News and World Report, 2016).

CREST has 16 Career Clusters and is part of WEST-MEC (Wester Maricopa Education Center). The students are required to complete a junior-level capstone course for graduation. A sampling of prior student projects include:

- Regenerative Technologies – Improve range of electric vehicles by power generation on board.
- Graphene – Applying graphene where its properties will be utilized.
- Hovercraft – Exploration of electronics and the investigation of how a hovercraft works.
- Tesla Coil – Charging.
- Algae Creation Environment.
- CO2 Sequestration in Symbiotic Relationships.
- Distillation.
- Artificial Intelligence Problem Solving.
- Improving the Structure of a Glove to Reduce Blunt Force Trauma.
- The Effectiveness of Banana Peels and Bio-sand in Filtering Tap Water.
- Ethanol From Switchgrass.

Seniors take dual credit Engineering courses at the University of Arizona, and complete an internship during their 12th grade year. A variety of student organizations are available to students including: Skills-USA Engineering and Automotive; Robotics; Woods; Welding; and Makerspace (Paradise Valley Schools, 2016).

Thomas Jefferson High School for Science and Technology; Alexandria, VA

Thomas Jefferson High School is comprised of 1843 Students in grades 9-12 and has a student/teacher ratio of 17:1. Ethnicity is primarily Asian (61%) and White (31%), with 42% of the school population being female. Only 2% of the population is economically disadvantaged (U.S. News and World Report, 2016).

The Technology program hosts 17 different advanced technological courses. The courses are: Advanced Analog Electronics; Advanced Communications Data Stream; Advanced Communications Signal Processing; Advanced Digital Electronics; Advanced Microprocessor System Design; Advanced Prototyping Processes; Alternative Energy Systems; Architectural Drawing & Design; Audio Electronics; Automation & Robotics 1; Automation & Robotics 2; Conventional Energy Systems; Design & Technology (IBET); Intro to Communications Systems; Intro to Engineering; Prototyping Development & Processes; and Specialized Computer Assisted Design. (Thomas Jefferson High School for Science and Technology, 2013)

The school has 15 different technology rich research laboratories including: Astronomy & Astrophysics; Automation & Robotics; Biotechnology & Life Sciences; Chemical Analysis & Nano-chemistry; Communication Systems; Computer Systems; Energy Systems; Engineering Design; JUMP Lab; Microelectronics; Mobile and Web Application Development; Neuroscience; Oceanography & Geophysical Systems; Quantum Physics & Optics; and Prototyping & Engineering Materials. In addition to the research laboratory projects, the students can participate in a mentoring program and conduct independent research projects with scientific, engineering, technological and industrial professionals (Thomas Jefferson High School for Science and Technology, 2015).

Examples of advanced student projects include:

- Development of a Portable Vacuum Powered Climbing Aid.
- Design and Construction of a Land Sail.
- Design and Creation of a Mechanical Helio-Tracker for Third World Countries.
- Design and Fabrication of a Di-wheel Vehicle.
- Design and Fabrication of a Glove-based Tele-operator for Remote Control of a Robotic Vehicle.
- Robotic Limb Prostheses.
- Quadcopter Use in Thermal Imaging.
- A Hexapod All-Terrain Walking Robot.
- Laser Range Finding System for an Autonomous Vehicle.
- Dell-Winston Solar Car Challenge.
- Biofuel Vehicle Conversion.
- Space Elevator 2012 Competition.
- Solar Array Design.
- The Effect of Exposure Time of Blue Light on Planarian Regeneration Rate.
- Creating an Electromagnetic Motion-Powered Generator.
- Using Ultrasonic Signals to Detect and Classify Flaws.
- Real-Time Orthogonal Frequency-Division Multiplexing System Using QPSK.

- Arbitrary-Constellation Quadrature Amplitude Modulation System.
- Near-Field Communication.

Student organizations available for students include: First Robotics; Excelsior Club (Physics/Aerospace/Engineering; TSA; and Women in Technology.

Pittsburg High School Center of Applied Learning; Pittsburg, KS

The school has 904 students in grades 9-12 with a student/teacher ratio of 16:1. The student body is primarily comprised of 64% White and 12% Hispanic, and has a 50% female population. The school has a higher economically disadvantaged population at 57% (Kansas State Department of Education, 2015).

The school has a unique Center of Applied Learning which houses two presentation areas (one doubles as a computer lab with monitors that rise from the tables), one production area (manufacturing/construction), and a communication/power, energy, and transportation lab. CTE courses are available to the students within the school (Automotive) and at the area Career and Technical Education Center. The Center of Applied Learning's curriculum consists of three distinct levels:

- Level 1 is Foundations of Technology (standards-based course; based on ITEEA Standards for Technological Literacy). Upon completion, students can go to Level 2 or go to a regional CTE center.
- Level 2 is Investigations (systems courses).
- Level 3 is Applications (capstone course).

The student organization TSA is open to all students at Pittsburg High School. It should be noted that Pittsburg State University faculty, including this author, were instrumental in developing the curriculum model for the Center of Applied Learning program with Pittsburg High School instructor Larry Dunekack prior to its implementation in 2012.

Downingtown STEM Academy; Downingtown, PA

Downingtown STEM Academy's student population is comprised of 763 students in grades 9-12 and has a student/teacher ratio of 14:1. The school's ethnicity is primarily White (83%) and Asian (14%) with a 49% female population. Economically disadvantaged students make up only 1% of the school's population (U.S. News and World Report, 2016).

The STEM program listed as #1 in the state of Pennsylvania for two years in a row and consists of four distinct courses: Intro to Engineering (9); Communications Technology (9-10); Engineering Technology (10); International Baccalaureate Design Technology SL and HL (Capstone Course). The Introduction to Engineering course is required of all students. Student clubs include: STEM Tech club; STEM TV; STEM Engage Club; and Engineering Club (Downingtown Area School District, 2016).

Lakeview Technology Academy; Pleasant Prairie, WI

Lakeview Technology Academy has a student population of 427 students in grades 9-12 and has one of the highest student/teacher ratios of 23:1. The school's ethnicity is predominately White (82%) with a small Hispanic population of 9%. Females comprise only 27% of the student body. This school has the most disproportionate ratio of gender of all of the selected schools in this study. No indicators were noted in the website review to account for this percentage. A moderate number of students fall into the category of economically disadvantaged (24%) (U.S. News and World Report, 2016).

The school's program consists of three courses which include Introduction to Engineering for 9th grade, Fundamentals of Manufacturing for 10th grade, and Gateway which is a capstone course for 11th and 12 grade students. The technology labs contain advanced machining and prototyping equipment and include: CAD, Robotics, CNC, Engineering Fabrication, Manufacturing, and Digital Electronics laboratories (Kenosha Unified School District, 2016).

One unique feature to the school is that faculty members provide free STEM summer camps to middle school students. Past camps have addressed Girls in Engineering, Electronics, and CAD. Students can participate in advanced clubs including: Supermileage Vehicle, Electrathon Vehicle, Summo-bots, and Underwater Robot. Dual credit can be attained through the local technical college.

ADDITIONAL: George Nettles 4th Grade FlexSTEM Classrooms; Pittsburg, KS

Although not included in data collection, this unique STEM laboratory opened in August of 2016. The three instructors recognized the need for implementing STEM into the curriculum to a greater extent than had been in the past. Prior to this year, students only participated in science activities at a regional education resource center one a month. Students now participate in "STEM Fridays" where they become active in integrated STEM projects which reinforce science and math concepts.

Since its implementation, over 90% of teachers from other grade levels in the school have started STEM Fridays within their respective classrooms. The STEM activities must be hands-on, and address science, mathematics, and technology standards.

The FlexSTEM classrooms are connected allowing for teacher collaborations. The connecting rooms also provide the ability to share equipment and capitalize on the individual expertise of the three teachers. Data will be collected during the 2016-2017 school year to see if there are significant gains in science and math test scores.

Pittsburg State University Technology & Engineering and Elementary Education faculty have been working with the teachers at George Nettles Elementary School to develop STEM lessons to implement into the FlexSTEM labs.

COMMONALITIES/GENERAL OBSERVATIONS

Inferential tendencies are visible throughout the study and based on data noted in Table 1 and Table 2. The following common themes are noted:

- Problem/Project-Based Learning is evident throughout the coursework within the school.
- A rigorous curriculum is present in each of the schools.
    - Most of the schools identified in this study have high graduation rates (98.5%) and STEM ratings (81.6%) exceeding the national average. The national average graduation rate is 72% (National Center for Educational Statistics, 2016), and the college readiness average is 33% (Camera, 2016).
    - Most have AP coursework.
    - Most have dual college credit available for students.
    -
- Most labs are well-equipped, with some having multiple labs of varying complexity.
- Most require some form of capstone course.
- Generally, most have low student/teacher ratios, averaging 18:1 or lower, indicating there is the potential for good student/teacher interaction.
- Generally, the male/female percentage is relatively equal,.
- There is a disparity in ethnic populations, with the majority of schools having an overwhelming majority being of White or Asian descent.

RECOMMENDATIONS FOR FUTURE STUDIES

Noted in Tables 2 and 3, minorities are greatly underrepresented in STEM programs, which limits the generation of ideas and brings to light some very concerning statistics with STEM education currently in schools. White and Asian race representation in comparison to other races is disproportionately high. Race disparity data was extrapolated from the U.S. News and World Report Best Schools (2016) and the Kansas Department of Education (2016) websites and are shown in the table below:

	White	Asian	Black	Hispanic	Other
10 UNIQUE	**60%**	**21%**	6%	9%	4%
TOP 30	**42%**	**41%**	4.5%	8.8%	3.7%

TABLE 1: DATA EXTRAPOLATED FROM TABLES 2 AND 3

To a lesser degree, there were inconsistencies in gender representation. In the 10 Unique STEM Program data, 40% (4/10) had female populations at 40% or lower. With one school only representing 27% female student population. The two schools with the lowest female representation were also recognized as having Technology in the name rather than STEM which could be a contributing factor. Within the Top 30 STEM School data, the number was closer to a balanced gender student population. The primary difference between the two studies was the Top 10 Unique Schools were chosen because they incorporated hands-on lab activities (U.S.

News and World Report, 2016). This could a determining factor for young females to enter those STEM classrooms. More data collection is needed to determine the actual causation. Facilities and projects could also be the focus for a study. The laboratory equipment, tools, software and hardware, along with the projects utilized in these unique/outstanding programs could be evaluated for commonalities and value. What evolves from such a study could redefine laboratory management and instructional delivery. Evaluating the faculty strengths could also determine the effectiveness of the curriculum and facilities.

A potential study could highlight a correlation between STEM school projects and laboratory spaces. Since this study utilized comprehensive laboratories as one of the selection criteria, and it was noted many did not meet this requirement based on school web site viewing. A more in-depth study of the top 100 STEM schools comparing the types of laboratories and experiences within them might establish the need for more hands-on experiences for students, and implementation of comprehensive laboratories within the schools.

CONCLUSIONS

This review of unique STEM programs highlights there are schools across the country providing exceptional STEM educational experiences for students. This research also provides only a small cross-section of STEM schools, and it should be reiterated other excellent schools and teachers are not represented in this study. The study also brings into focus the need to improve the majority of STEM programs to include comprehensive hands-on laboratories and activities to connect math and science concepts to technology and engineering applications. Without similar facilities and laboratory experiences in all schools, many capable, intelligent, creative students will not have the opportunity to learn to their full potential.

DATA COLLECTION TEN UNIQUE STEM PROGRAMS

SCHOOL	LOCATION	# ST	S/T RATIO	STUDENT CLUBS	AP CW/ RSCH	RACE					GENDER % FEMALE	FRL	CHARTER/ MAGNET	T&E Classes		
						White	Asian	Black	Hispanic	Other				T&EE STEM	PLTW	CTE
High Tech High School	Lincroft, NJ	286	13	1	1	47%	52%	0%	1%	0%	33%	1%	0	1	0	0
Center for Applied Professional Studies	Olathe, KS	1000		1	1	70%	0%	7%	14%	9%	48%	29%	1	0	1	1
Cazenovia High School	Cazenovia, NY	666	13	1	1	95%	2%	1%	2%	0%	50%	11%	0	1	1	1
STEM School Chattanooga	Chattanooga, TN	275	15	1	0	56%	2%	35%	5%	2%	37%	49%	0	0	0	0
Stuyvesant High School	New York, NY	3293	22	1	1	22%	73%	1%	2%	2%	40%	47%	0	1	1	0
Paradise Valley High School Crest	Gilbert, AZ	1771	18	1	1	46%	3%	4%	42%	5%	47%	24%	0	1	1	1
Thomas Jefferson High School for Science and Technology	Alexandria, VA	1843	17	1	1	31%	61%	1%	2%	5%	42%	2%	0	1	0	0
Center of Applied Learning	Pittsburg, KS	904	16	1	1	68%	0%	4%	15%	13%	46%	65%	0	1	0	1
Downingtown STEM Academy	Downingtown, PA	763	14	1	1	83%	14%	1%	2%	0%	49%	1%	0	1	0	0
Lakeview Technology Academy	Pleasant Prairie, WI	427	23	1	1	82%	3%	4%	9%	2%	**27%**	24%	0	1	1	1
		1123	**17**	**10**	9	**60%**	**21%**	6%	9%	4%	42%	25%	1	8	5	5

TABLE 2: DATA COLLECTION 10 UNIQUE STEM PROGRAMS (U.S. News and World Report, 2016) (Kansas State Department of Education, 2015)

DATA COLLECTION TOP 30 STEM PRORAMS

	SCHOOL	Students	Ratio ?/1	Female %	White%	Asian%	Black%	Hispanic%	Other%	Graduation Rate (72% Natl)	College Readiness (33% Natl)	Free/Reduced Lunch	Public	Charter	Private	Magnet
						Race Percentage							Type Of School			
1	High Tech High School/NJ	286	13	33	47	52	0	1	0	100	100	1	1			
2	Early College at Guilford/NC	195	24	54	47	34	7	3	9	100	97.9	10	1			
3	Thomas Jefferson HS for Science & Tech/VA	1843	17	42	31	61	1	2	5	100	100	2	1			
4	BASIS Scottsdale/AZ	756		46	47	43	2	5	3	100	100			1		
5	Whitney High School/CA	1022	25	52	5	80	2	10	3	100	98.8	19	1			
6	BASIS Tucson North	913		50	52	20	3	21	4	96	100			1		
7	Raleigh Charter High School/NC	545	13	57	60	18	5	3	13	98	93.3	0		1		
8	International Community School/WA	427		54	49	39	1	5	6	98	72.1	2	1			
9	Academy of Allied Health & Science/NJ	282	10	61	63	30	3	2	2	100	71.2	7	1			
10	Troy High School/CA	2270	27	49	22	48	1	24	5	97	58.3	16				1
11	DeBakey HS for Health Professions/TX	823	16	59	10	42	19	27	2	100	95.2	45				1
12	Poolesville High School/MD	1202	18	50	56	26	5	7	6	98	81.6	7				1
13	Palo Alto High/CA	1944	18	49	53	28	3	10	6	96	69.2	7	1			
14	Monta Vista High/CA	2351	26	51	16	78	0	3	3	99	82.5	2	1			
15	Bergen County Academies/NJ	1060	12	53	42	47	1	6	4	100	84	4	1			
16	Stuyvesant High School/NY	3293	22	40	22	73	1	2	2	99	84.4	47	1			
17	Lynbrook High/CA	1861	24	49	12	81	1	3	3	98	78.7	5	1			
18	W Windsor/Plainsboro HS North/NJ	1562	13	47	35	51	8	5	1	97	60.1	5	1			
19	School of Science and Engineering/TX	387	16	26	15	11	19	52	3	100	100	58				1
20	Charter School of Wilmington/DE	970	5	51	65	26	5	3	1	100	87.1	2				1
21	Mission San Jose/CA	2167	25	48	7	89	1	2	1	96	86.2	3				1
22	School for Talented & Gifted/TX	247	15	59	36	25	14	23	2	100	100	23				1
23	Darien High School/CT	1354	12	50	92	3	1	4	0	98	56.3	1	1			
24	Solon High School/OH	1705	18	48	67	12	16	2	3	98	60.9	16	1			
25	Pine View School/FL	2180	17	53	74	10	1	9	6	100	100	11	1			
26	Pittsford Sutherland High School/NY	971	12	53	83	7	4	4	2	98	80.8	4	1			
27	Conestoga High School/PA	2054	17	51	78	15	4	2	1	99	61.3	6	1			
28	Dougherty Valley HS/CA	2381	24	48	18	66	4	6	6	98	64.8	7	1			
29	University High School/CA	2402	28	47	35	50	2	8	5	95	63.3	14	1			
30	Cupertino High/CA	2079	25	48	20	63	2	11	4	97	60	10	1			
	TOTALS	1384	18	49	42	41	4.5	8.8	3.7	98.5	81.6	12	20	3	0	7

TABLE 3: DATA COLLECTION TOP 30 STEM PROGRAMS (U.S. News and World Report, 2016)

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