

STEM in Dublin City Schools

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The Facts

- An estimated 80 percent of the jobs in the U.S. will require technology skills, and by 2018.
- Need for women and under represented minorities.
- Current Freshman are 13% more interested in STEM than Seniors.
- US is in STEM graduates.

US	South Korea	France	China	Singapore
1%	38%	47%	50%	67%

- 1/3rd of students lose interest in STEM by 4th grade, another 17% in middle school.
- Most students (especially girls) lose interest between 3rd and 6th grade.

References:
-Moss, Cindy "Using STEM to transform teaching and learning", BASA Presentation 2013, Columbus, Ohio
-"100 CEO Leaders Discuss the Importance of STEM in U.S." STEMconnector, 2013
-"Getting Kids Excited About STEM", www.education.com, Feb. 2013.

The Facts Cont.

Interest of Ohio High School Students by STEM Discipline

Discipline	National Average	Ohio Average	Ohio Male	Ohio Female
Science	9.4%	9.2%	8.9%	9.4%
Technology	5.8%	6.3%	11.8%	1.5%
Engineering	11.7%	12.3%	23.5%	2.7%
Mathematics	2.1%	2.3%	2.6%	2.0%

OH vs. National:

Students in Ohio are more likely than students nationally to be interested in a Software Development major/career.

Female students in Ohio are slightly more likely to say they are interested in a Chemical Engineering career than female students nationally.

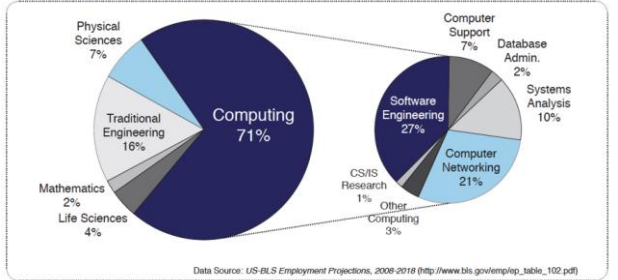
Asian students in Ohio are significantly more likely to say they will pursue a Computer/Information Sciences career than Asian students nationally.

26.4%
of High School Students in Ohio are Interested in STEM
Compared to 25.5% Nationally

Hispanic students in Ohio are more likely to say they are interested in a Physics major/career than Hispanic students nationally.

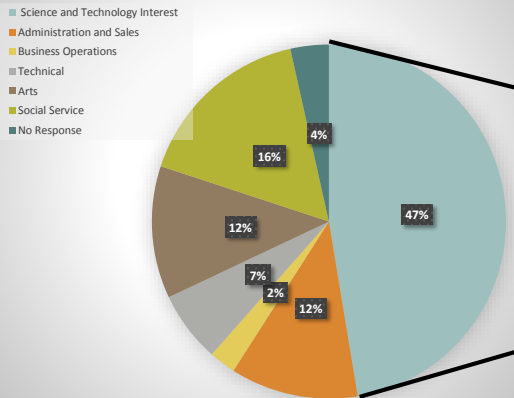
Caucasian students in Ohio are more interested in a major/career in Software Development than Caucasian students nationally.

Percentage of New STEM Jobs by Sector Through 2018

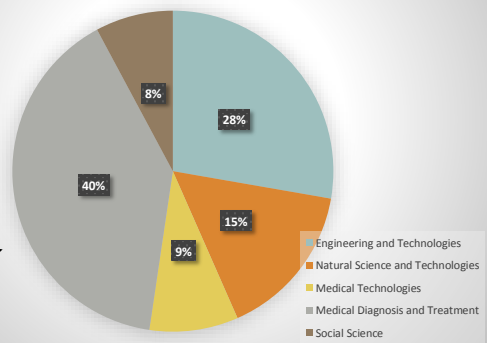


Student Preferences

Student Career preference, 10th graders 2011-2012, Dublin City Schools



Student Career preference in Science and Technology Fields, 10th graders 2011-2012 Dublin City Schools



What is STEM Education?

Science, Technology, Engineering and Math

- Interdisciplinary
- Collaboration
- Real-Life Applications
- Hands-On
- Community
- Technology
- Integrated
- Problem Based
- Project Based
- Scientific Inquiry
- Discovery
- 21st Century Skills

WHAT WE CAN DO

Triggering students' interest in pursuing more technical fields begins in schools. There are many effective strategies for engaging students and improving their performance in STEM subjects:

The infographic is divided into four circular icons, each with a corresponding text label below it:

- Interdisciplinary project-based learning:** An icon showing a pencil, a calculator, a notebook, and a beaker.
- Real-world learning through internships, mentors:** An icon showing a person in a lab coat, a person with a magnifying glass, and a person with a computer.
- Teachers trained to work in specific STEM disciplines:** An icon showing a person in a lab coat, a person with a magnifying glass, and a person with a computer.
- Opportunities for college instruction during high school years:** An icon showing a multi-story building.

Resources

Science, Technology, Engineering and Math

[Scratch Programming](#)



[Buck Institute](#)



[Curiosity Machine](#)



[Engineering by Design](#)



[Engineers are Cool](#) (Video)



[Project Lead the way](#)



Free Curriculum through ODE

[Little Bits](#)



[Why we need STEM Education](#)



[ODE STEM](#)



About



- STEM (Science, Technology, Engineering and Math) education.
- Project and Problem-Based, Hands-On, Real-World, Standards-Based
- Programs
 - **Elementary Program (2014)**
 - **Gateway to Technology (our STEM course in 8th Grade)**
 - **Pathway to Engineering**
 - **Biomedical Sciences Program**
 - **Computer Science Pathway (coming 2015)**
- PLTW courses within an Academy are high school weighted credits.
- Earn CTE credits for an equivalent course at any Ohio Public Univ. for PLTW classes taken in high school.
- Example: PLTW Digital Electronics = Ohio University Digital Electronics
 - THIS IS NEW! And will take clarification from OBR.
 - IED = CS ENGT 1115, DE = CS EET 1105
- Upon completion of four PLTW classes, student is given credit at various schools nationwide.

About



Cont.

	Elementary Modules	Gateway to Technology (STEM)	1 st	2 nd	3 rd	4 th
Biomedical Science	Coming as modules within existing courses Fall 2014	Automation and Robotics, Design an Modeling and Energy and the Environment (8 th grade in Dublin)	Principles of Biomedical Systems	Human Bodies	Medical Interventions	Capstone Course
Pathway to Engineering			Introduction to Engineering Design	Principles of Engineering	Elective Course	Capstone Course
Computer Science			Coming Soon for PLTW! 2015			



Currently offered in Dublin City Schools

About current STEM offerings

* = Possible College Credit

Current STEM Courses			
Science	Technology	Engineering	Math
Biology	Web Page Design	STEM (8 th grade only) (PLTW)	Geometry
Chemistry	Computer Programming	Introduction to Engineering Design (PLTW)	Algebra I and II
Physics	Computerized and Advanced Accounting	Product Design and Modeling	Statistics
Environmental Science	College Computer Skills	Engineering Design	Discrete Math
Human Anatomy	Computer Science	Architectural Engineering	Pre-Calculus
	Principles of Business		Calculus
	Computer Graphics		Accounting
	Graphic Design		

PLUS ACADEMIES ON FOLLOWING PAGES

Biomedical Research Academy

Geared for future biomedical professionals

Application Required

Open enrollment, 3 periods, 1 year long, at Scioto

Targeted for 11th, 12th graders but 10th can enroll if they have their own transportation.

Underlying practices include technical writing, 3D art, and biological research protocol. Biological problems and solutions are investigated through authentic case students, inquiry-based queries and open experimentation. In addition students will get a chance to explore medical professions in a variety of specialties through regular classroom visits from industry professionals and field trips.

About

Course	Total Credits	Weighted Credits	College Credit	PLTW?
A.P Biology	2	1	AP	No
Anatomy and Physiology	1	0		2014?
Medical Interventions	1	1		Yes
3D Art	0.5	0		No
Capstone Research Project				

Engineering Academy

Geared for future engineers

Application Required, Must be accepted to OSU

Open enrollment, 3 periods, 1 year long, at Coffman

Targeted for 11th, 12th graders

Focuses on developing good engineering practices, from initial brainstorming through design, building and testing. The academy has a hands-on focus. Students will learn university and industry standard software packages in 3D design, programming and circuitry.

About

Course	Total Credits	Weighted Credits	College Credit	PLTW?
Principles of Engineering	1	1	CT?	YES
Digital Electronics	1	1	CT?	YES
Calculus (OSU at Coffman)	1	0	OSU	No
Matlab (OSU at Coffman)	1	0	OSU	No
Capstone Project				

OSU Credits are for ENG 1221, ENG 1187 and Math 1151

Still learning about Career Tech. Credits! Will post info. as I learn more.

Business Academy

Geared for students interested in business

Interview Process

Partnership with Tolles
additional STEM opportunities are offered onsite at Tolles

Open enrollment, 3 periods, 1 year long, at Jerome

Targeted for 11th, 12th graders

DBA students will contribute and study all aspects of running a real world business. Students will gain 21st century skills during this exciting experiential learning opportunity. Students will operate Dublin Designs, an existing full service screen-printing and design company.

About

Principle	Total Credits	College Credit
Accounting	3	Art. Credit through Tolles/CSCC
Management		
Marketing		
Accounting		
Design/Operations		

Potentially changing in 2014

Teachers Academy

Geared for students interested in teaching

Interview Process

Open enrollment, 3 periods, 1 year long, at Scioto

Senior Only

Students will be given an opportunity to get a head start on the path to a successful career in education

About

	Course	Total Credits	College Credit
Internships	Early Childhood	3	6 CTAG for Ohio Public Univ.
	Middle Childhood		
	High School		
	Special Needs		
Seminars	2/week at Scioto		

Young Professionals Academy

Geared for students to explore 2 future career paths

Application, Interview, Selection Process

Open enrollment, 2 periods, 1 semester in length

Students released periods 6-7 for class and internships with mentors M-F.

Targeted for 11th, 12th graders – must provide own transportation

Time and stress management, decision-making, career testing, teamwork, business writing, resume development, interview skills, networking, collaboration with professionals, social medial, portfolio development, and more.

About

	Course	Total Credits
Internships	Career Choice 1 – 6wks	1.5
	Career Choice 2 – 6wks	
Principles	Leadership Styles	
	Technology Skills	

Energy and the Environment Academy

Geared for Environmental Engineers,
Environmental Scientists or Political Science majors

Application Required

Open enrollment, 3 periods, 1 year long, at Jerome

Targeted for 11th, 12th graders

Using integrated learning this academy explores global population, economics, politics, and ethics and world views as it pertains to the atmosphere, hydrosphere, geosphere and the biosphere. This academy allows students to explore career opportunities in the fields of urban planning, environmental design, ecological restoration, energy production as well as other careers in sustainability and environmental science.

About

Course	Total Credits	Weighted Credits	College Credit
AP Environment Sci.	1	Yes	AP
American Government	.5	0	
Int'l Diplomacy	.5	0	
Apps in Tech. in Science	1	0	
Technical Writing	.5	0	
Advanced Research Topics	1	Yes	