

STEM* Ready

****Science, Technology, Engineering, Mathematics***
**Helping Your Student Make Smart,
Career-Ready Choices**



Provided by



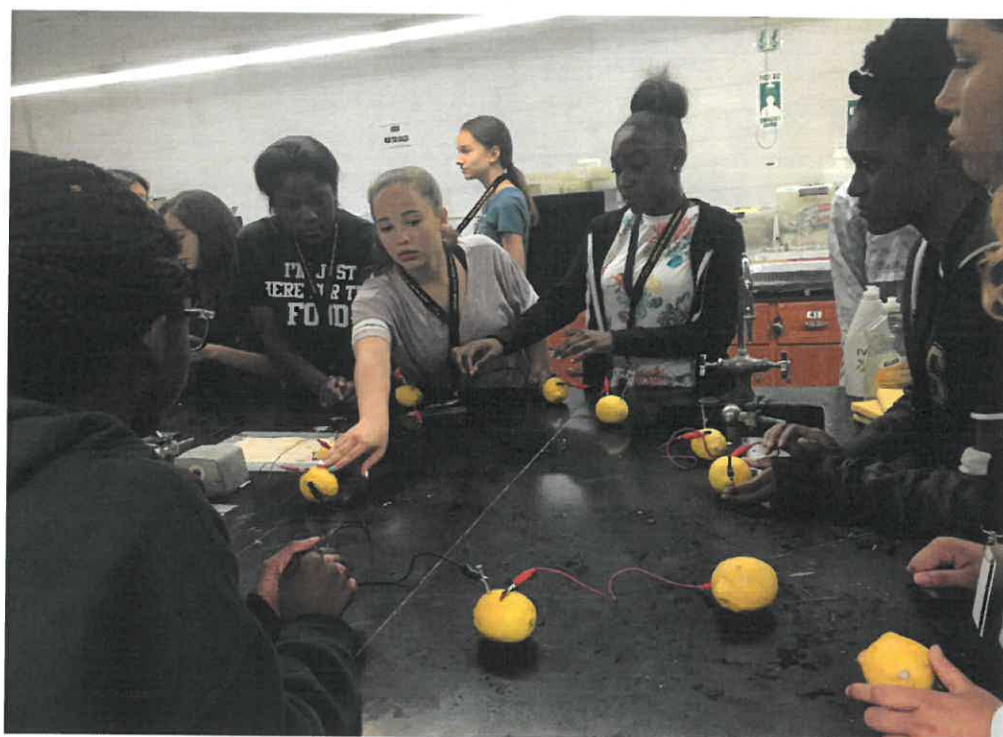
**Center for Pre-College
Programs**

**Campbell Hall 4th floor
University Heights**

Inspiring young minds for college access and success in Science, Technology, Engineering, and Mathematics (STEM)

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Greetings from the NJIT Center for Pre-College Programs



Dear Parents,

Science, **T**echnology, **E**ngineering, and **M**athematics are much more than popular school subjects representing the latest trend in education. Commonly known as “STEM,” these content areas unlock ways of organizing and viewing our world.

Many reports have been written to raise awareness about the need to provide a skilled workforce that is prepared to lead and innovate in a STEM-driven world economy. Indeed, the juxtaposition of statistics between the number of existing jobs (and those yet to be created) and the number of trained professionals who are prepared to fill them is alarming. Perhaps Christie and Schwarz said it best: *“Three things are true in STEM: There are a lot of job openings. These jobs pay well. And there are not enough qualified people to fill these jobs.”*

Whether your son or daughter aspires to build bridges, style hair, run a library, dance, design sneakers, play professional sports, create video games, or find a cure for diseases, he or she will benefit from a strong STEM education. This Family Workshop series is designed to help you explore STEM concepts in ways that will increase your understanding of how student success in STEM education fosters student success in life which ultimately contributes to the advancement and well-being of our global society.

Thank you for joining us.

Sincerely,

Jacqueline L. Cusack, Ed.D.

Executive Director, Center for Pre-College Programs



Getting Ready for High School & College Math and Science

Cementing Understanding

Learning certain ideas and taking certain courses will set your student up for success in high school and beyond.

Students **MUST** understand **fractions and proportional reasoning** to master math and science.

- ✓ *Picturing fractions* really cements understanding. Ask your child to draw a picture of common fractions ($1/2$, $1/3$, $1/4$, $1/5$, $1/8$) using a “candy bar” model. [Tip: even though U.S. textbooks use a lot of “pie” models, they are really hard to cut into equal pieces and fractions are *all about* “equal”. Asian textbooks use bar models almost exclusively.] Ask them to draw a picture of **operations with fractions** (add, subtract, multiply, divide)
- ✓ **Proportional reasoning** allows you to think flexibly about changing amounts – the basis of algebra and many science topics like balancing equations in chemistry. Encourage your student to use proportions to compare everything.
- ✓ Understanding underlying concepts and principles that cut across all fields in **Science** is at least as important as memorizing formulas. See <https://www.nextgenscience.org> for the current thinking, and NJ-adopted standards, in science.
- ✓ Check with your school or district for the **high school course sequence**. Algebra, Geometry and Statistics help you learn to think in different ways. They are great preparations for college courses in many fields. If your student is interested in a STEM career, taking calculus in high school can help. But being *ready* to take calculus as a college freshman is essential. Science courses may still be organized discretely – Biology, Chemistry, Physics is typical – or they may be integrated topics each year.

When You Think You’re Done, You’ve Just Begun – Doing Homework SMART

You’ve finished the homework assignment. But you’re not *done* with homework. These simple

steps are the difference between doing the homework and learning the material for the long-haul. They’ll help you *own* the learning.

State the major ideas the homework. How do they apply to in the real world?

Memorize any new vocabulary or formulas. Write them down (and explain) without looking at the book or your notes. Then check yourself.

Act it out. Using your body to learn activates more of your brain and helps it store the information where you can “find” it (recall it) again and again.

Read over your notes/the textbook or handouts. Do you understand them better now that you’ve done the work? Write down any questions you have and ask/email your teacher.

Take a break before you start another subject. Get up and move around for 5-10 minutes. Most important, get a drink of WATER. Your brain needs to hydrate, too!

Keep the Arts in Your Life

Music – listening to it, dancing to it, or playing it - gives your brain additional pathways to holding onto all kinds of knowledge.

Art – drawing, painting, sculpture - helps you to see the world in different ways. It can help you visualize what you can’t see - molecules, atoms quarks, the shape of the universe, the color of dinosaur skins can all become more “real” if you can picture them in your mind, on a screen or on paper. That helps you can communicate your ideas to others, too.

Movement – Being physically active matters! It helps cement learning and raises oxygen levels.

STEM Connections & STEM Careers

Sources: <https://www.bls.gov/>
<https://www.geteducated.com/careers/stem-majors>
<https://www.learnhowtobecome.org/careers-in-mathematics/>
<http://stemcareer.com/>
<https://money.usnews.com/careers/best-jobs/rankings/best-technology-jobs>



FIELD	SAMPLE OF CAREER PATHS	
Science	Petroleum Chemist	Medical Technician
	Semiconductor Engineer	Paleo Climatologist
	Veterinary Imaging Technician	Oceanographer
	Research Botanist	Tree Ring Analyst
	Space Photography Specialist	Astronaut Mission Spec.
	Astrophysicist	Nuclear Medicine Spec.
	Teacher/Professor	Environmental Engineer
Technology	Graphics Specialist	Database Manager
	Game Designer	Toolmaker
	Informatics Specialist	Systems Engineer
	Open Source Developer	Cybersecurity Analyst
	Programmer	Web Developer
	Software Architect	Resource Specialist
	Teacher/Professor	Inventor
Engineering	Chemical Engineer	Sewage System Designer
	Biomedical Engineer	Traffic Specialist
	Architect	Structural Engineer
	Materials Specialist	Riveter
	Model Maker	Medical Technician
	Bridge Inspector	Water Systems Engineer
	Teacher/Professor	CAD Specialist
Mathematics	Actuary	Geographer
	Sports Statistician	Hydrologist
	Big Data Analyst	Market Research Analyst
	Chartered Accountant	Economist
	Analytics Manager	Stock Market Analyst
	Investment Advisor	Research Mathematician
	Teacher/Professor	Acoustic Consultant

Resources for Families

New Jersey Institute of Technology (NJIT)

Opened in February 1885, NJIT has grown from a student body of 88 to an internationally recognized polytechnic university with diverse programs and research interests. Seeking to prepare K-12 students for college access and success in STEM fields before the term had been coined, NJIT established a Center for Pre-College Programs in 1979. With a broad range of offerings from one-day, hands-on workshops to early access to college coursework to competitions to multi-week summer camps, the Center for Pre-College Programs nurtures students' interests and adults' preparation in STEM fields and the Humanities. See www.njit.edu/precollege for more information.



Websites

STEM Careers and Preparation

<http://stemcareer.com/> Pre-college, college, and career information. See especially the "Popular Topics" bar

<https://stemstudy.com/stem-careers-glossary/> Short explanations of the focus of a wide range of STEM careers

https://www.asce.org/about_civil_engineering/ Range of information about civil engineering

<https://www.ieee.org/communities/index.html> Range of information about electrical engineering; see especially Education tab

<http://tryengineering.org/> PreK-12 information about engineering sponsored by IEEE (see above); includes games, lesson plans, career information

For websites of other engineering societies, enter the branch of engineering in a search engine.

Academic Standards

<https://www.state.nj.us/education/aps/cccs/math/> New Jersey K-12 Student Learning Standards in Mathematics; includes information about assessment

<https://www.state.nj.us/education/aps/cccs/science/> New Jersey K-12 Student Learning Standards in Science; includes Engineering and information about assessment

<http://www.nextgenscience.org/> Next Generation Science Standards (national K-12 science standards) and information about ways of organizing science instruction; includes Engineering

<https://www.state.nj.us/education/aps/cccs/tech/> New Jersey K-12 Student Learning Standards in Technology; includes Engineering and information about assessment

STEM Support at NJIT

NJIT Center for Pre-College Programs

<http://www.njit.edu/precollege>

Campbell Hall – 4th Floor

University Heights

Newark, NJ 07102

973-596-3550

Early College Preparatory Programs (ECPP) – Summer programs for Gr4-11

Mrs. Suzanne Berliner-Heyman

berlines@njit.edu

973-596-3550

Academy College Courses – College courses on campus for HS students

Mrs. Gabriella Cuzzola

gabriella.m.cuzzola@njit.edu

973-596-6507

Family Programs

Dr. Barbara Weller

weller@njit.edu

973-596-5492

NJIT General Information

973-596-3300 or 1-800-925-NJIT

<http://www.njit.edu/>

NJIT Undergraduate Admissions

<http://www.njit.edu/admissions>

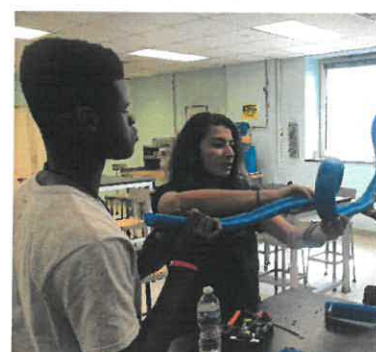
New Jersey Institute of Technology

Office of University Admissions

Fenster Hall, Room 100

University Heights

Newark, NJ 07102





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