STEM* Ready

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

Provided by

NJIT
New Jersey Institute of Technology
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, Technology, Engineering, and Mathematics 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 \( \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{8} \) 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.

S - State the major ideas the homework. How do they apply to in the real world?
M - Memorize any new vocabulary or formulas. Write them down (and explain) without looking at the book or your notes. Then check yourself.
A - 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.
R - Read over your notes/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.
T - 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.bls.gov/)  
- [https://www.geteducated.com/careers/stem-majors](https://www.geteducated.com/careers/stem-majors)  
- [http://stemcareer.com/](http://stemcareer.com/)  

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