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SySTEM ALERT!

Tomorrow is almost here.

Is STEM in our future?

In this issue of *SySTEM Alert!*, we'll look at prospects for jobs in **STEM (science, technology, engineering, math)**. This field is huge and diverse and is growing like wildfire – and it is transforming the world as we speak. Do you want a piece of the action? Read on to discover why a career in a STEM field might be right for you.

STEM jobs are growing fast!

STEM jobs are the most rapidly growing sector in the country. Between 2009 and 2015, the number of STEM jobs on average grew at double the rate of other jobs. That suggests there will be many opportunities and many openings to fill.

See pages 2 and 3 to learn about several STEM careers.

STEM makes the world a better place!

What do disease, food shortage, and environmental damage have in common? All three are problems with potential scientific and technological solutions. Many compassionate, concerned people specialize in STEM fields to help make a difference.

Epidemiologists research the causes and spread of disease. **Soil scientists** study soil and agricultural practices to improve the production of food and the wise management of land. **Industrial microbiologists** help industries produce safe products and lessen their environmental impact.

See page 4 to learn one student's thoughts on STEM's power to change the world.

STEM jobs pay well!

In a 2015 study, the United States Bureau of Labor Statistics found that the national average wage for non-STEM jobs was $45,700 per year. But the average for STEM jobs was $87,570 – almost double! Not all STEM jobs were in that pay league, of course. Still, of the 100 STEM jobs surveyed, 93 had above-average wages!

STEM skills are valuable!

There are many fields that aren't classified as STEM but do rely on STEM skills. For example, nursing is not always considered to be a STEM field, but nurses must have specialized science and technology training. Building a foundation in STEM while in school will provide knowledge and problem-solving skills that will aid in life and in your career.

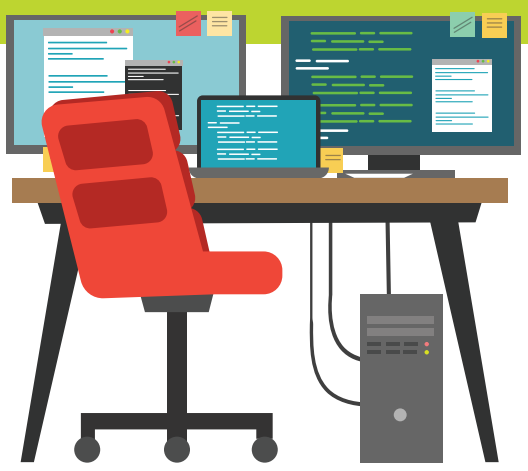
See page 4 to learn what employers say they wish students knew.

STEM is in demand!

Employers across the nation are making it known they want more applicants with STEM skills. Many STEM jobs might relate to interests you already have.

Do you enjoy working with computers? If so, you've got opportunities waiting for you. Jobs in computer and information systems are booming. The field of **software developer** employs more people than any other STEM job. Others such as **computer user support specialist** and **computer systems analyst** are close behind.

Do you think like an engineer? A recent survey discovered there are more than 900,000 jobs in engineering, architecture, and related fields in the United States. The largest occupation was **civil engineer**, but there are plenty of others such as **mechanical engineer**, **electrical engineering**, and even **land surveyor**.

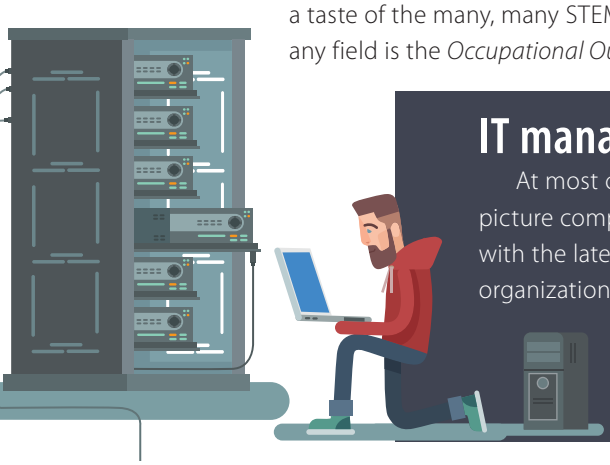


STEM starts

Explore the website.

Students who don't love math and science might believe they aren't the right fit for a STEM career. But there are STEM jobs for almost every interest and personality! Are you a social butterfly? Do you venerate art and design? Do you want to make the world a better place? The career you seek might be in STEM.

Here are nine promising and diverse careers that are in STEM or rely on STEM skills. These are meant to give you only a taste of the many, many STEM career paths available. A great resource for exploring jobs in STEM or any field is the *Occupational Outlook Handbook*. Explore the website at www.bls.gov/ooh.



IT manager

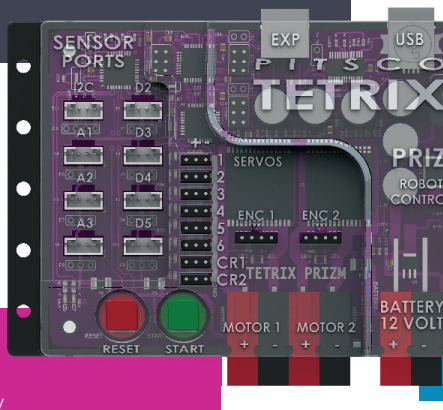
At most companies, the IT manager is **the** tech guru. These experts have their eye on the big picture computer and software needs of their companies. This means not only staying up to date with the latest developments in technology but also being savvy about the operations of the organization. Often IT managers choose a specialization. For example, if fending off cyberattacks sounds like a thrill, a career as an IT security manager might suit you.

Education: At least a bachelor's degree in Computer or Engineering Science

Learn more!

Taking Control STEM Expedition®

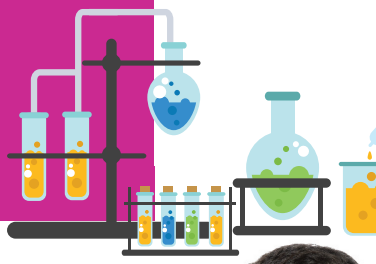
In *Taking Control*, students create a program to accomplish a task using a microcontroller. They learn how the commands are formatted, how some sensors work, and how logic is used to control the actions of a system. Students use knowledge gained to diagnose improper operation of a system and make the corrections necessary for the successful operation of the control system.



Medical scientist

Medical scientists work for human health and welfare. To do this, they perform studies, experiments, and research to understand human diseases and the effects of medication. Medical scientists working in a university have more freedom to pursue their own interests, whereas those working for private companies focus on research areas that benefit their companies.

Education: PhD in Biology or Life Science



Agriculture and food science technician

Though we take them for granted, modern standards of food safety have greatly improved human well-being. For this, we can thank the technicians who work on farms or in laboratories to test food and agriculture products to ensure they are safe and high quality. Taking animal and crop samples and keeping records is a big part of the job. Some technicians might also do additional farm labor, depending on the job.

Education: Associate's degree in Biology, Chemistry, or Crop or Animal Science

Safe Food STEM Expedition

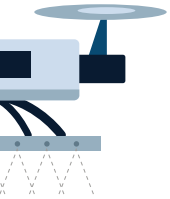
In *Safe Food*, students learn about food chemistry by completing comparison studies of the six major nutrients. They discover how bacteria and other contaminants can cause food poisoning and learn safe food practices. The Expedition culminates with students' developing new guidelines for the state health official.

Learn more!

Civil engineer

Next time you drive on a road, go over a bridge, or visit an airport, you can thank a civil engineer. Civil engineers are the visionaries who design and build the core infrastructure that keep our civilization thriving. Responsible for huge and costly projects, they must have a big-picture sense and an eye for detail.

Education: At least a bachelor's degree in Civil Engineering or Civil Engineering Technology



Physicist

Physicists tackle big questions – really big questions. What laws govern the universe? What is the nature of time? How do energy and matter behave? Physicists develop theories and test them. Often their tests are so cutting edge that they must also design the testing equipment! Understanding the data requires intense math. The findings of physicists might seem aloof from day-to-day life, but they inspire new technology and help us understand our world.

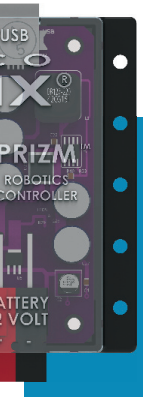
Education: Bachelor's degree or PhD in physics, depending on position

Sales representative for technical and scientific products

You might not think of sales as a STEM job, but when you are selling technical or scientific products, you must have the background to understand the ins and outs of your products.

Working in sales means seeking out customers, developing sales pitches, and following up after a sale to make sure all needs have been met.

Education: Bachelor's degree in a field related to the product sold



Software developer

The demand for computer software is growing at a tremendous rate, so software developers are in very high demand. Hard workers with computer programming skills can do very well designing games, phone apps, or business software. As with many STEM careers, skills such as creativity and communication play a huge role. Software developers usually work on teams and must understand the needs of the end users.

Education: Bachelor's degree in Computer Science

Audio engineer

It is the person singing into the microphone who gets the spotlight, but in reality, it takes a team to create a hit song. One of the unsung heroes in the music industry is the audio engineer. Also called sound mixers, these people use equipment to record and mix music and other audio. An audio engineer brings a deep understanding of technical aspects of audio.

Education: Usually an associate's degree or vocational certification; good computer skills are a must.

Making Waves STEM Expedition

In *Making Waves*, students explore the properties of sound waves including frequency, wavelength, and amplitude; discover how the ear interprets sound; and experiment with a variety of waves. Students design and create a tunable music instrument with a unique sound.

Learn more!

Forensic psychologist

Are you interested in understanding what makes humans tick? Forensic psychologists are valued by the justice system for their expertise in human psychology. Their knowledge helps police investigate crimes and helps judges and juries decide cases. As this profession has matured, it has become more scientifically rigorous and there has been a greater emphasis on advanced training.

Education: PhD in Clinical Psychology with additional education in Forensics

The skills employers crave

Many students struggle to decide on a career path. Even if you don't have a clear idea for your profession, you can still prepare for your career now. How can that be? Because there are some skills that apply to almost every job.

P21®, an organization that works to bridge the gap between business and education leaders, has identified four core innovation skills that "separate students who are prepared for increasingly complex life and work environments in the 21st century, and those who are not." They call these skills the 4Cs:

- **Creativity –** brainstorming, refining, and implementing ideas
- **Critical thinking –** reasoning, big picture thinking, making logical connections
- **Communication –** expressing ideas clearly and being attentive to others
- **Collaboration –** teamwork, flexibility, and responsibility

Great, but how do you get these skills? You will have to push yourself out of your comfort zone! Take classes that challenge you and expose you to many different concepts and careers. Be bold and share your ideas in a group setting even if you are unsure of them. Join innovative clubs and after-school activities that give you skills relevant to the real world.

Changing the world: STEM according to Kayla

Many students now know that STEM skills open many well-paying career opportunities. But fewer realize that STEM skills are helping people bring positive change to the world at large.

We recently spoke with Kayla, a student at Bertie Middle School in Windsor, NC. After being exposed to STEM though the Pitsco Expeditions, Kayla – an ambitious, big-picture thinker – had no doubts about its value.

"STEM is beneficial for everybody, not even just kids . . . STEM should be a worldwide process where everybody gets a bit of it wherever they are."

"STEM is beneficial for everybody, not even just kids," she said. "STEM should be a worldwide process where everybody gets a bit of it wherever they are."

Kayla's enthusiasm is fired by both personal and altruistic reasons. She credits the Expeditions with opening her up to the field of science, and she is contemplating careers that combine science and law. The Expeditions, she says, have opened her eyes "to new experiences and new opportunities to help make the world a better place."

Putting more real-world science knowledge in the hands of people around the world could reap great benefits. After learning the process of water purification in an Expedition, she reflected that this knowledge could benefit citizens of other countries where clean water isn't readily available.

"I feel like my fellow students appreciated getting a new vibe, learning what STEM is and being pushed toward the right career path. . . . It has helped them believe in the future and believe in themselves."

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Student name: _____ **Class/Hour**: _____

SySTEM Alert! Quiz (Volume 7, Number 1)

1. What are the 4Cs of work in the 21st century?
    A. caring, cooperation, community, communication
    B. core competency, calculation, computer skills, coding
    C. computer skills, cooperation, creativity, critical thinking
    D. creativity, critical thinking, communication, collaboration

2. How much does the average STEM job pay compared to the average non-STEM job?
    A. about half the wage of the average non-STEM job
    B. the same as the wage of the average non-STEM job
    C. almost double the wage of the average non-STEM job
    D. four times the wage of the average non-STEM job

3. How fast are STEM jobs growing compared to non-STEM jobs?
    A. The number of STEM jobs is growing at half the rate of non-STEM jobs.
    B. The number of STEM jobs is growing at the same rate of non-STEM jobs.
    C. The number of STEM jobs is growing at double the rate of non-STEM jobs.
    D. The number of STEM jobs is growing four times the rate of non-STEM jobs.

Match the following STEM careers with their job duty.

4. Medical scientist
5. Audio engineer
6. Civil engineer
7. IT manager
8. Software developer
9. Forensic psychologist
10. Sales representative for technical and scientific products

A. is responsible for company's computer and software needs
B. seeks out customers and develops pitches
C. helps police investigate crimes
D. designs and builds core infrastructure
E. studies, experiments, and researches to understand human diseases
F. designs games and applications
G. uses equipment to record and mix music

Bonus:
Choose one of the careers listed above. Imagine it was your job. Write a paragraph describing what you would like about the job and how the job might help the world.