

# HOW TO RAISE A SCIENTIST

By Marcia Wade Talbert

**AS A KID GROWING UP ON THE SOUTH SIDE OF Chicago, Jason Coleman loved to tinker with electronics, take apart household items, and build remote control cars. But he had no idea what an engineer was until after his first semester in college.**

"I was doing engineering, I just didn't know what it was called," says Coleman, 32. "Growing up I wanted to be a pharmacist; I saw pharmacists and I heard stories about them making good money, but I never met engineers."

Seun Phillips, on the other hand, grew up living with a civil engineer, his dad, in the same household, but before participating in a pre-college science program, he had no idea what his father or other engineers did from day to day. "The fact that I was good in math and science led me to be in the engineering realm," says Phillips, 28. "I didn't have exposure to what an engineer was, which speaks volumes to the fact that the STEM fields aren't being promoted as much as they should be."

Coleman and Phillips, products of the Chicago public school system, not only majored in mechanical and electrical engineering in college, respectively, but later worked several years as senior engineers at Motorola Inc., designing mobile phone devices. In 2009, the young men partnered with another friend, George Wilson, to launch Project SYNCERE (Supporting Youth's Needs with Core Engineering Research Experiments), a free summer, after-school, and Saturday nonprofit program with the goal of increasing the number of minority, female, and underserved students pursuing careers in the fields of science, technology, engineering, and mathematics.

African American students are not pursuing STEM fields after graduating high school at the same rate as students of other races. From 2001 to 2009, no more than 8.5% of all students who progressed through college with a degree in science or engineering were black, and as of 2008, fewer than 4% of all people employed as scientists and engineers were African American, according to the most recently available data from the National Science Foundation. ▶

What teachers, parents, and schools can do to increase African American participation in science, technology, engineering, and math





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Meanwhile, jobs in science, technology, engineering, and math are expected to grow by 17% between 2008 and 2018, nearly double the growth of all other fields, reports the U.S. Department of Commerce. STEM jobs also pay more. The average annual wage for all STEM occupations was \$77,880 in May 2009, and only four of the 97 STEM occupations had mean wages below the U.S. average of \$43,460, according to the Bureau of Labor Statistics. This disparity in the face of expected job growth begs the question: How do parents, teachers, and schools produce more African American students who not only have an interest in STEM, but who also excel academically and envision a future career for themselves in STEM?

### Six Steps to STEM

According to the Organisation for Economic Co-operation and Development's Programme for International Student Assessment (OECD/PISA), when it comes to achievement in science, math, and overall studies, there are **six factors** associated with academic success among disadvantaged students worldwide:

- Confidence in science abilities
- Motivation to learn science
- Engagement in science activities outside the school
- An increase in the number of science courses students take
- An increase in the amount of time students spend learning science at school
- Exposure to science-related careers

Coleman and Phillips have been able to apply each of these factors to their own organization. At Project SYNCERE ([www.projectsincere.org](http://www.projectsincere.org)), where 100% of high school participants graduate and 90% of them enroll in a four-year university or college, students build robots, program video games, and design 3-D models of tablet computers and smartphones using a 3-D printer, among dozens of other activities. This year students are not only building solar panels to help power the classroom of a local school, but they are calculating the number of solar cells needed to replace traditional energy sources, determining the most efficient configuration to place the cells in, and then building the encasings for the solar panels.

Daniel Banks is an example of how Project SYNCERE helps students. Banks started his sophomore year at Perspectives Calumet High School with a 1.9 GPA. He was absent most of that year due to suspensions from fighting or disrespecting teachers. "I didn't think I needed to go to school. I didn't know anything about what I wanted to do and no one was pushing me to go to school," says Banks.

It wasn't until he participated in Project SYNCERE's summer program that he began to gain confidence in his ability to succeed. He started attending classes more regularly, applied himself to physics class, began taking notes in all of his classes, and entered science competitions. He graduated with a 3.0 GPA and is now entering his sophomore year at Wartburg College in Iowa with hopes of becoming a civil or mechanical engineer.

### Build Confidence

Black students lack confidence for many reasons, but in some cases, they psyche themselves into believing stereotypes about which races are capable of being scientists and which aren't, according to Kim Magloire, founder and president of SciTech Educational Solutions, a test prep and

## What Parents Can Do To Help Their Child Succeed in STEM Fields

Kim Magloire, president and founder of SciTech Educational Solutions, offers these tips:

1. **Learn how** to navigate the education system. At the elementary school level, parents must be advocates for their children and ask how many hours a week are devoted to science. As your child transitions from middle school to high school, determine what are the sequence of classes that are necessary for STEM-related disciplines.
2. **Find out** the requirements for students who wish to enroll in AP courses. Teachers are often the gatekeepers who decide which students participate in AP courses.
3. **Assess** if your child has developed good study and note-taking skills. Many parents assume that these skills are taught in school. If your child has not mastered these skills, ask a guidance counselor for possible programs that teach them.
4. **Enroll your child** in a hands-on science or math after-school, summer, or research program. The experience will enrich their perception about science.
5. **Consider tutoring programs** for struggling students. The earlier you can help your child address his or her weaknesses in science or math, the less likely he or she will need remedial help later in their academic career.
6. **Expose your child to STEM** mentors who can guide and inspire them.

SOURCE: SCITECH KIDS

educational consulting firm that hosts a weekly summer camp, SciTech Kids ([www.sci-techkids.com](http://www.sci-techkids.com)). Parents and teachers should expose black students to examples of successful black scientists; Magloire suggests that students will gain confidence in STEM once they realize that success in STEM has nothing to do with race.

For example, Banks says he gained confidence in his ability to succeed after Project SYNCERE took fourth place in a robotics competition his junior year. His ►



MAGLOIRE EXPOSES KIDS AS YOUNG AS 3-YEARS-OLD TO SCIENCE.

confidence also grew from the experience of working next to African American instructors like Coleman and Phillips.

“We were able to mentor Banks. We worked with him personally... showing him that there was something else to do. We talked to him about our [jobs at Motorola, and opportunities we had] traveling to China, Germany, and Australia prior to product launches,” says Phillips, director of programs at Project SYNCERE. “When we gave him projects, he understood what he could possibly be.”

### Provide Early Motivation

The earlier parents arrange for their children to participate in hands-on, problem-solving activities, the better. By the time most teens are in high school it’s too late to pique their interests in science and math because they haven’t received the skill set necessary to nurture their innate sense of curiosity. By fourth grade, the average student, regardless of race, begins to lose interest in science and math, says Magloire.

“It is not an achievement gap, it is an exposure gap,” says Magloire, a former biologist, epidemiologist, and master instructor for the Princeton Review. “The earlier we engage them in STEM, the earlier we encourage those who have that ability and [the more] we will start seeing those numbers rise.”

With Central Park as the backdrop and ready-made laboratory, Magloire’s New York City summer camp, SciTech Kids, targets children as young as 3 years old to learn about science using everyday items such as soda bottles to simulate tornadoes, or tin foil and pizza boxes to make solar ovens. The kids also keep science journals.

Parents can gain feedback about the efficacy of a program based on what their children are like when they return home, says Magloire, who is releasing a book on helping students excel in STEM next year. She says if children are excited about

what they’ve learned, talkative, and open to teach the parent or siblings, then the program has been effective in motivating their curiosity in STEM.

### Keep Kids Engaged After School

The PISA/OECD report shows that the lack of or inadequacy of science laboratories in schools is another factor that affects a student’s instruction. As a result, parents need to enroll their children in science clubs, excursions, field trips, or science competitions to increase their child’s engagement and performance in STEM. However, Magloire and the Project SYNCERE founders all realized that students are more engaged by hands-on projects.

Bank’s distractions began to dissolve as he became more motivated by SYNCERE’s Saturday engineering camp held at the University of Illinois at Chicago. “In a science class in school you wouldn’t build a robot or go through the steps to program it to go in circles, or talk for you, or tinker with circuits,” he says. “The hands-on learning of Project SYNCERE is what really got me into it.”

### Increase the Quantity of Classes

If parents want to ensure that a career in science is a viable option for their child, they need to assess the number and type of science classes offered to their child in school. “In order to build a pipeline of African American students in STEM disciplines, it is critical to address the educational disadvantages in our K–12 system. Even if kids are already motivated, I found they needed to put in a lot more work to catch up with their peers,” explains Magloire.

The PISA/OECD report found that the average resilient student—defined as one who succeeds against the odds—engaged in a larger number of courses than the average disadvantaged low achiever. ▶

As a school consultant helping schools develop rigorous science and math enrichment programs, Magloire found that some textbooks are outdated at elementary schools in many underrepresented neighborhoods. In high schools, Magloire has observed that many minority schools started freshman students out in classes such as Earth science or forensics. “It’s OK for an eighth grader or a middle schooler, but it should not be a class for a high school student who might pursue STEM in college,” she explains.

### Increase the Quality of Classes

Oftentimes, students who are seemingly adept at STEM in high school are still not prepared for college-level coursework. Predominantly black high schools should prepare students who aspire to get a STEM college degree by offering more honors and Advanced Placement classes. Even if a student doesn’t “pass” an AP class with a score of three or more, the experience provides the student with the study skills and work ethic necessary to prepare him or her for college. Also, few African American students realize that colleges don’t require an AP grade for admission, yet they look at students who take an AP class more positively, says Magloire.

African Americans represented 14.7% of the total public high school graduating class last year, but made up 4.1% of the AP student population who earned a score of three or better on at least one exam, according to the College Board’s *AP Report to the Nation*. Furthermore, 59.8% of all students who take AP exams get a passing score of three or higher. That number drops to 27% for African Americans. “That means we’re really behind if we’re using [AP scores] as a benchmark,” Magloire says.

The first year after she helped to install AP classes and train teachers at the Eagle Academy for Young Men in New York City, some 25% of students at the Eagle Academy received a score of three or better. Also, compared to students in that year’s cohort who weren’t exposed to AP classes, Magloire’s AP students were more prepared for the rigors of college, and were accepted to higher ranking colleges, some receiving full scholarships, she says.

### Expose Kids to Professional Careers

The involvement of corporate and professional organizations such as the National Society of Black Engineers is another necessary element that further contributes to an increase of African Americans in STEM—not just financially, but through job shadowing and mentorship programs. Students who regularly interact with professionals often feel stronger connections between STEM lessons and their career pursuits, and may, in fact, perform better in school, suggests Coleman

For example, last fall, IBM Corp. partnered with the New York City Department of Education, the City University of New York and the New York City College of Technology to launch Pathways in Technology Early College High School. P-TECH’s graduates can receive both their high school diploma and a free associate degree in applied science in computer systems technology or electromechanical engineering technology, and are first in line for consideration for entry-level positions at IBM.

None of the students were hand-picked high achievers. Ninety-two percent of the students are eligible for free or reduced

## K–12 Programs From Black Professional Organizations

The more interaction your child has with professionals in science the more likely they will be able to identify themselves as scientists-in-the-making. Encourage your school, faith-based institution, or STEM organization to partner with one of these professional member organizations.

- **The National Black Data Processing Associates:** The BDPA Annual National Youth Technology Camp (YTC) [www.bdpa.org](http://www.bdpa.org)
- **The National Organization for the Professional Advancement of Black Chemists and Chemical Engineers:** Step Up to Science [www.nobcche.org](http://www.nobcche.org)
- **The National Society of Black Engineers:** Summer Engineering Experience for Kids (SEEK). [www.nsbe.org](http://www.nsbe.org)
- **The National Society of Black Physicists:** Science Ambassador program [www.nsbp.org](http://www.nsbp.org)
- **The National Society for Minorities in Agriculture, Natural Resources, and Related Sciences:** Junior MANRRS chapters [www.manrrs.org](http://www.manrrs.org)

lunch, and 85% of the student body is African American. Yet, the attendance rate was 94.2%, and 98% of students promoted from grade nine to 10. Seventy-three percent of students passed both the English Language Arts and the Integrated Algebra regents exams. “In year one, students get more time in English and math, which are huge building blocks for STEM majors,” says P-TECH principal Rashid Ferrod Davis, who formerly ran the Bronx Engineering and Technology Academy.

Davis says that the pipeline to STEM is a three-ringed approach that involves colleges, industry, and support organizations. Schools, he believes, should attach themselves to organizations and corporations that have a proven track record of steering students in the right direction.

To succeed in STEM-related fields, students need effective science and math instruction, inquiry-based teaching, academic advising, social support, and mentors, says Magloire. Not one of these elements alone will work on the population of K–12 African Americans students. But without such efforts African Americans are slated to take a permanent second-class station not only in the innovation economy, but in America.

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