



## The lowdown on STEM schools

Given the crying need for graduates with science, technology, engineering, and mathematics (STEM) degrees, is a STEM school right for your child?

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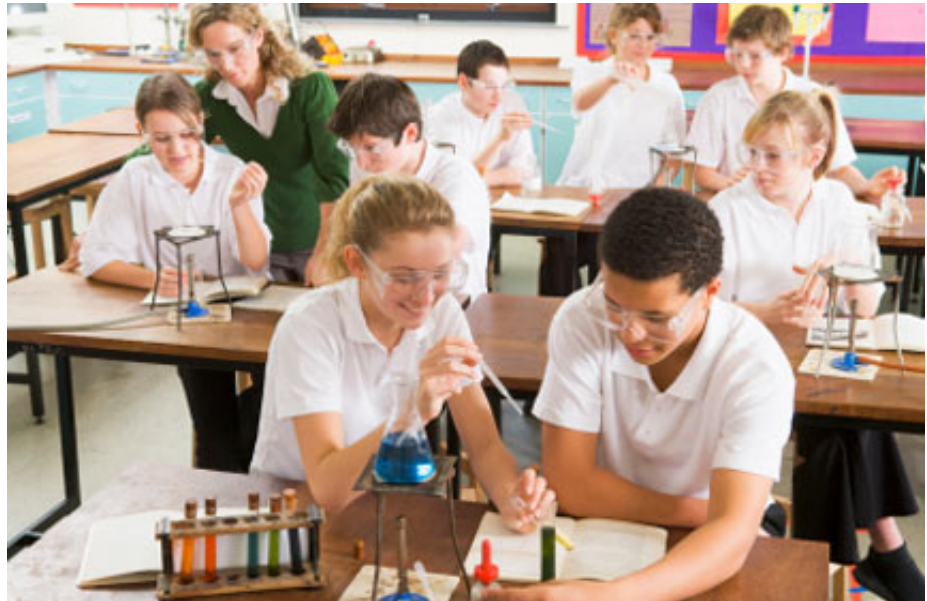
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By Crystal Yednak

A high school student tosses a ball into the air and watches it fall. Then he films the falling ball and graphs the movement on his computer. Nearby, a sophomore scrawls out equations with a blue marker, while a classmate looks over his shoulder and shakes her head. "I think that number should be negative." They come to an agreement before the teacher stops by, nudging them to explain how they got it. This action-packed hour is a science class — "Scientific Inquiry — Physics," to be exact.

This type of noisy, exuberant classroom exemplifies what Science, Technology, Engineering, and Math (STEM) schools are about. Learning is collaborative and project-based; kids work closely together in a hands-on way to solve real-world problems. Learning problem-solving skills — and helping students develop into creative, critical thinkers — is at the core of any true STEM school. "Teachers are not just telling us," says Jennifer Bailey, 17, a senior at the [Illinois](#)

[Mathematics and Science Academy](#). “We use our own data and discovery to realize a concept.” While all schools teach math and science, good STEM schools focus deeply on these subjects in hopes of better preparing students for the high-demand tech jobs of the future.

## Is a STEM school right for my child?

If your child has an innate interest in science or building things, a STEM school may be a natural choice. But administrators say these schools cater to all kinds of learners and that most students appreciate the hands-on nature of the curricula. Students who manage their time well may succeed in STEM programs that are self-paced and have kids working on independent projects.

## Why you might consider a STEM high school

Over the past 10 years, [jobs in STEM fields have grown three times as fast as jobs in non-STEM fields](#), according to the Department of Commerce, and STEM fields are expected to grow by 17 percent between 2008 and 2018, compared to just 9.8 percent growth for non-STEM fields in the same time frame. But without an influx of graduates in these areas, the U.S. will not have enough workers to fill those jobs. STEM schools can help young people gain the skills necessary to succeed in these fields. Over the next decade alone, the U.S. must produce approximately 1 million more STEM-degree graduates than currently projected to meet the demands of the economy, according to a 2012 report by the President’s Council of Advisors on Science and Technology. Recognizing this gap, educators have focused on getting more students hooked on math and science earlier in their school careers, which is why more [STEM programs](#) are being launched nationwide.

You’ll mainly find STEM high schools, but there are some middle schools with a STEM emphasis, too. Some STEM schools are open to all students, meaning there are no tests required; others are selective and consider a student’s academic record in admission decisions.

There are three primary types of STEM programs:

- **A STEM specialty school:** The entire school's focus is on STEM and every student participates in a curriculum of science, technology, engineering, and mathematics.
- **A STEM program within a larger school:** Some schools create STEM academies within their schools that allow interested students to study STEM in more depth.
- **Residential STEM programs:** For these intensive programs, students live on campus and attend a STEM school.

Programs may delve broadly into all STEM subjects or they may specialize in a particular area, such as computer technology.

[Vocational or CTE programs](#) that prepare students for certain high-tech fields also fall within the spectrum of STEM schools.

## What you might find in a STEM classroom

- **Students behaving as scientists:** On a typical day, they may be recording observations, carrying out experiments, or conducting their own research. Learning is project-based and sometimes messy, but students learn by doing, not by rote memorization.
- **Connecting STEM learning to a career:** To help students understand what kind of STEM jobs are available, schools may bring in tutors from local technology companies or organize internships at hospitals or research institutions.
- **Integrating with other subjects:** Science, Technology, Engineering, and Math subjects are woven into other areas of the curriculum, with courses such as the "History of Science" or "Environmental History."
- **Making use of technology:** By taking quizzes on their laptops, entering data into spreadsheets, and creating graphs to illustrate the results of their experiments, students are using technology in their daily studies. STEM programs such as [L&N STEM Academy in Knoxville, TN](#), participate in one-to-one programs through which students are given their own individual computer (or iPad, in this case) for their work. Teachers may have web pages featuring necessary classroom materials, which may also allow students to work ahead if they want to or review a lesson if need be.
- **Noise:** Classrooms are not quiet and are often arranged so that students can sit and work in groups. This encourages collaboration as students discuss their work and challenge

each other's ideas.

## Questions to ask when considering a STEM school

- **Is this really a STEM school?** With the recent national focus on creating more STEM graduates, “You see lots of places springing up calling themselves STEM schools, but they don’t necessarily have a clearly articulated explanation of what makes them STEM,” said Christopher Kolar, founding co-chair of the Committee for the Advancement of STEM Specialty Schools. Does the school offer a full STEM program beyond the science and mathematics offered in typical schools? A look at the course schedule may indicate whether the coursework is there to challenge students and prep them for higher-level college STEM courses. For instance, are pre-calculus, calculus, and AP calculus offered? Can students take a second year of physics or engineering? Consider the breadth and depth of the school's STEM offerings.
- **Does it help prepare students for a STEM career?** To be sure the school is properly preparing students for the jobs of the future, ask school administrators if they communicate with students’ potential employers. Businesses should be partners, bringing in resources, providing role models for students, and keeping staff up-to-date on new developments so the curriculum stays relevant.
- **Are students working with computers and other technology?** Or are the new iPads sitting in a box in the corner because teachers have not been trained on how to incorporate them into lesson plans? Ask for examples of how [laptops](#) (or [tablets](#)) help with instruction and if the administration provides ongoing technology training for teachers. Likewise, does the school have the lab equipment necessary for students to do a broad range of experiments?
- **Do teachers have backgrounds in the subjects they are teaching?** Science should be taught by teachers who are excited about and understand science. Also, do mentoring programs exist to encourage teachers to improve their STEM skills and knowledge?

## What supporters say

If we want to have the scientists and engineers to solve future problems, STEM schools are important to the country's future: finding sustainable energy sources, keeping water supplies clean, and discovering new technologies that help us compete in a global economy. Supporters say there is an urgent need to attract and educate more students in these fields and keep them engrossed throughout their elementary, high school, and college years. And from the student's perspective, if they have the skills employers need, they will have an easier time finding a job upon graduation.

## What critics say

By increasing the emphasis on science, math, technology, and engineering, some worry that students may lose out on other key skills. Electives like foreign languages and the arts help foster creativity and broaden students' world view. Some STEM programs try to make up for this by offering arts programs after school; others say they recognize the need and incorporate as much arts education as they can into the school day.

Because girls historically have not shown the same interest in STEM fields as boys, critics say the schools need to do more to reach out to girls and get them excited about science by providing role models in female scientists or crushing traditional gender stereotypes in the classroom.

## A final word of advice

Make sure you understand how fully the school has embraced a STEM curriculum. If you are expecting your child to be taking advanced physics courses and the school only offers one introductory course, both you and your child could be disappointed. Ask the school to see sample schedules. As always: [visit any school you're considering](#). Talk to teachers about the ways students use technology in class. Poke your head in the labs. Ask what professional development opportunities exist for teachers to stay on top of their game and whether the school has networked with local companies and research institutions.

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