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**NSTA WebNews Digest**

## **NSTA Reports**

### **The Rise of STEM Clubs**

**3/5/2010 - NSTA Reports—Debra Shapiro**



Teachers are discovering they can spark students' interest in science, technology, engineering, and math (STEM) by involving them in a STEM club. Unlike traditional science or math clubs, STEM clubs give students experience with four subjects and offer a wider range of activities and real-world experiences. They also provide alternative learning methods that can reach students who normally would struggle with these subjects.

Biology teacher Joelle Miller sponsors a STEM club at River Hill High School in Clarksburg, Maryland, that gets students involved in state and national Science Olympiad tournaments. Over the past three years, membership has grown to about 70 students. "The kids are building bridges and rockets and doing things you couldn't even dream of," she says.

Miller has brought in guest speakers and coaches from area colleges and businesses to help students prepare for the competition and expose them to career opportunities. She says students have benefitted from this interaction: "The amount of information they learn is incredible." Students even construct their own practice tests for the Science Olympiad, she notes.

As a result of their club participation, Miller reports two students completed a university organic chemistry

course while still in high school “to get more experience;” one student was nominated for a scholarship this year; and many club members are motivated to seek and obtain summer internships in STEM fields.

Miller says her club’s success has spurred her colleagues to start STEM clubs to “try to appeal to everyone, so everyone has something to participate in.” More than 250 students are active in her club and two others: the rocketry club and the ecology club, which gets students involved in school-wide recycling and trains them to conduct energy audits of nearby homes. Teachers are mindful of the other clubs’ meeting schedules when establishing their own, she points out.

Teachers like Miller who participate in STEM clubs have “an appreciation for effective instruction” in which “a big emphasis [for students] is on the doing, not on the watching,” says William Ottman, science and technology field coordinator for New York’s Syracuse City School District. He says the clubs meet teachers’ needs for “more resources and opportunities to work with students,” and students are “rewarded by learning through actual projects,” being able to “learn in a way that’s fun,” and having a chance to enter competitions.

Ottman recalls, “When I launched rockets in sixth grade, those are the things I remember from school.” He says these “authentic experiences” can propel students into engineering fields. He thinks the hands-on team learning in STEM clubs is a model for what should happen in “the traditional classroom,” but often doesn’t. He speculates students and teachers must really feel the difference when they transition from the club to the classroom.

Another feeling STEM club students might experience is the stress of preparing for a competition, but Ottman says it’s good for students to be accountable and have “an expectation that they have to perform.” Many middle and high school STEM clubs are geared toward entering competitions, he observes.

Ottman also points out these clubs can provide opportunities for girls and urban students “to get involved in the STEM areas.” He says he has seen scholarships “go unused” in his urban district due to lack of student interest in STEM subjects, and he thinks STEM clubs can remedy that problem.

## College Clubs

Lisa Butler, a member of the STEM club at Middlesex Community College in Bedford, Massachusetts, says at first membership was “two-thirds faculty, and the club itself was not actually a club by school standards.” She signed up, but was concerned because “without student leadership, it was more or less a string of faculty-organized events.” Fortunately, according to Butler, student “leadership [and] involvement has gradually increased.” She has grown to appreciate that club members and faculty “are such a diverse group, really representing all aspects of STEM.”

To recruit members, “we use word-of-mouth and fliers around school,” explains Butler, “[and] we will have a table at our school’s club fair.” The club’s Facebook page “has garnered student interest while allowing us to stay connected,” she notes. That community has more than 90 members, “although some of those are alumni and instructors,” she points out. “We even had a ‘Teach Your Teachers’ session in which STEM students walked STEM faculty through the creation and use of a Facebook account!”

Most of her club’s activities “are tours of facilities,” says Butler. “We’ve been to Novartis [Pharmaceuticals Corporation], Northeastern [University], the Museum of Science [Boston], and University of Massachusetts Lowell nuclear, baseball, and robotics labs.” She says members “hope to organize some student creation

projects; for example, an egg drop [in which] students design holding vessels out of predetermined materials.”

“The egg drop is just one of several ideas we have proposed,” observes new member Calais Powers. “Most of them have a definite ‘cool’ or ‘fun’ factor, but we really want to reinforce the science behind these as well.”

## Starting a Club

When starting a STEM club, “the teacher has to be passionate about it,” contends Miller, adding, “It’s been tons of work, but it’s been great.” She advises teachers “to start small [because] it becomes overwhelming fast.”

Starting small includes “starting out with only one competition,” then providing extensive publicity for the winners, which helps get more students interested, says Miller. Starting small also means making sure enough funding is available. “Don’t do a robotics club first,” she warns, because robotics clubs require a lot of seed money.

Build your club around your students’ interests, and distribute plenty of flyers and announce the club’s meetings regularly, she counsels.

Local businesses also can help. Check whether they “offer donations or host events that the STEM club could become involved in,” says Ryan Terpening, technology education teacher at Corcoran High School in Syracuse, New York.

Companies can provide guest speakers. “Have a guest speaker come visit the club, and then go on a field trip” to that facility, says Kimberly Smith, a chemistry professor at Glendale Community College, Glendale, Arizona. “This approach (lecture, then field trip) works really well,” she notes. She also advises “learn[ing] your school’s rules on student travel” and “how to properly fill out all the forms to save you many headaches.”

Butler says faculty should “pay attention to your classrooms. Recognize your leaders, and approach them with the idea, the appropriate tools, and positive reinforcement. Student involvement is contagious, but you need driven individuals prepared to pave the way. All of the coaching will pay off when you hear your hallways buzzing with STEM-talk.”

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Telephone: 703.243.7100 • Fax: 703.243.7177

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