

STEM Competitions, Challenging your students!

With 36 years of Technology Education instruction under my belt... I have found that most students get excited about being part of a competition. Whether that competition is on a sports field, court, pool or in the technology lab... it gets students motivated to go beyond the basics. We currently live in a different time and place from when I started teaching in Bloomsburg, PA. I was a graduate of Manheim Township and Millersville University. Arriving in Bloomsburg in 1987 was a shocking experience... Their normal graduating class is about 100 students. We currently have about 85-90 students per class. I'm currently the only high school Technology Education teacher in the district. Thus, getting students involved and motivated in Tech related challenges is an important aspect to our success.

Over the years we have competed in a number of engineering events. Starting off with TSA in 1998... I was a student teacher for John Bratton at Conestoga Valley High School. Mr. Bratton was the Grand Dad of PA-TSA. Having that background experience, I was familiar with some of the TSA events, however, I decided to get my kids involved after attending a TEEAP Conference and sitting in on a TSA session.

Hopefully, you can find the right STEM competition that allows you to be successful while still challenging your students along the way. After 25 years of unique engineering challenges... it seems like I started my career a few years ago... not a few decades ago!

- **Technology Student Association** - TSA chapters take the study of STEM beyond the classroom and give students the chance to pursue academic challenges among friends with similar goals and interests. Together, TSA chapter members work on competitive events, learn and apply leadership skills, and may attend conferences at the state, regional, and national levels.
<https://tsaweb.org> - National
<https://patsa.org> - State
- **National Robotics League** - Is a manufacturing workforce development program where students design and build remote controlled robots to face-off in a gladiator-style competition. Through the manufacturing process of Bot building, students' imaginations are captured as they design, build and compete with their own robotic creations.
<https://gonrl.org>
www.Rage-in-the-Cage.com - a regional robotic event normally hosted in the Central PA area. Feel free to Contact Kirk Marshall for more information about this competition.
- **F1 in Schools** - The F1 in Schools challenge inspires students to use Integrated Technology to learn about physics, aerodynamics, design, manufacture, branding, graphics, sponsorship, marketing, leadership/teamwork, media skills and financial strategy, and apply them in a practical, imaginative, competitive and exciting way.

Student teams design and fabricate scale F1 Race Cars that are CNC manufactured. These cars are then raced against others from across the globe.

<https://www.f1inschoolsna.org> - North America F1 in Schools

<https://www.f1inschools.com> - International F1 in Schools

- **Red Bull Engineering** - is all about innovation, improvisation and invention. Teams find inspiration for their human powered aircrafts or soapbox cars trying to make the biggest impact to the target audience. And of course... either fly or out race the opponent. **Flugtag** is the German word for “Flying Day”, which is a competition that challenges the brave and brainy to design and build Human-Powered flying machines and launch them off a flight deck 40ft in the air!

<https://www.redbull.com/us-en/shows/red-bull-flugtag>

Soapbox challenges the most fearless, fun-loving and foolhardy teams to prototype and create the wackiest of rides. Up for it? Then prepare to propel your car to the finish line and hope gravity is on your side. Welcome to the pinnacle of non-motor-racing!

<https://www.redbull.com/us-en/events/red-bull-soapbox-race-usa-2022>

- **Sea, Air and Land Challenge** - is a STEM initiative in which teams of high school or middle school aged students learn about the engineering process through the design and build of a robotic system. The systems are then used to compete in challenges.

This Challenge provides the opportunity for students to tackle a difficult engineering task while working with educators and engineering mentors. The teams have twelve to sixteen weeks to design and build unmanned vehicles and intelligence, surveillance and reconnaissance (ISR) payloads to compete in the Challenge of their choice – teams may build submersibles for the Sea Challenge, drones for the Air Challenge or rovers for the Land Challenge. The challenges are designed by engineers at the Penn State Applied Research Laboratory. Sea, Air and Land Challenge hosts a number of Regional events throughout PA and surrounding states.

<https://seairland.psu.edu>

- **Sea Perch** - SeaPerch is a remotely operated vehicle (ROV), a competition, and a community. Our program guides students on building an underwater robot while supplying educators with the tools and training to help them through the process.

Curiosity, creativity, and a desire to understand the world around us are traits that come naturally to kids. They also happen to be great attributes for STEM professionals. Learning technical content and skills is vitally important. When this learning is tangible and connected to the real world, the impacts can be profound. Sea Perch is a Regional, National and International event.

<https://seaperch.org>

Events that I have not been directly involved with:

- **The FIRST LEGO League Challenge** is an international competition organized by FIRST for elementary and middle school students. Each year in August, FIRST LEGO League Challenge teams are introduced to a scientific and real-world challenge for teams to focus on and research.

<https://www.firstlegoleague.org>

- **First Robotics Competition** – Is the ultimate Sport for the Mind. High-school student participants call it “the hardest fun you’ll ever have.” Under strict rules, limited time and resources, teams of students are challenged to raise funds, design a team "brand," hone teamwork skills, and build and program industrial-size robots to play a difficult field game against like-minded competitors. It’s as close to real-world engineering as a student can get.

<https://www.firstinspires.org>

- **BEST Robotics** - Take plywood and a box filled with items such as PVC pipe, screws and other hardware, an irrigation valve cover, piano wire, aluminum paint grid, a bicycle inner tube, a BRAIN (BEST Robotics Advanced Instruction Node programmable platform), and something called a micro-energy chain system and try, within six weeks, to design and build a functioning machine that can perform certain, specific tasks in three minutes. What do you get?

You get BEST, a middle and high school robotics competition whose mission is to engage and excite students about engineering, science, and technology as well as inspire them to pursue careers in these fields.

<https://www.bestrobotics.org/site>

- **Samsung Solve for Tomorrow Contest** - Samsung hosts a \$2 million national competition for public schools grades 6 – 12 in which student are asked to consider how science, technology, engineering and math (STEM can be used to create change in their communities. Their teacher will apply on their students’ behalf to the contest and compete to win up to \$100,000 in prizes for their school.

<https://www.samsung.com/us/solvefortomorrow>

- <https://www.instructables.com/contest> - Instructables is committed to helping teachers inspire, engage, and prepare students through hands-on projects to make in the classroom. There are Challenges running at all times that students can document their projects that they build in class. A great way to get students to document their work... with a chance to win up to \$500 per entry. These challenges are a great stepping stone to other technical writing experiences that are in most STEM Challenges.

Find the competitions that your students seem to be interested in getting involved with. They will be the ones that will be driving the program... so make sure they are invested in the challenge. If I can be of any assistance, please feel free to contact me,

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