

Team Name	Berry Consultants / National Instruments / Texas Instruments / Westlake & Eanes Science and Technology Association / Pixels and Verbs, LLC / BAE Systems / Texas Workforce Commission / SolidWorks / Eanes Independent School District & Eanes ISD
Team Sponsors	Berry Consultants National Instruments Texas Instruments Westlake & Eanes Science and Technology Association Pixels and Verbs, LLC BAE Systems Texas Workforce Commission SolidWorks Eanes Independent School District
Impact on Team Members	In the past 6 years, FIRST has permanently impacted Team 2468 by inspiring us to improve our skills in CAD design, use of the CNC and 3-D printing machines, programming, electronics, and teamwork. It also has aided the pursuit of careers in STEM by encouraging us to expand the HS curriculum to include electronics, Robotics 2 & 3, & CAD classes. Through training and personal and professional networks that FIRST led us to establish, our graduates are employed at companies like GE, TI, and Samsung.
Role Model Characteristics	We inspire youth to engage in STEM programs by our progression of FLL, BEST, FTC and FRC programs, expanding by 6 teams in the last 4 years. We help create a culture where science and technology are celebrated through our invited participation in efforts in LEGO, TCEA, College and Career Fairs, and SXSW. Team members and mentors model the FIRST principle of gracious professionalism at competition by helping other teams find success. Last year an assisted team advanced to semifinals at Dallas.
Impact on Community	We've reached out to local and global communities with the inspiration of FIRST. We mentor 2 BEST & 4 FTC teams, tripling since last year. We attend the TCEA Conference to help teachers understand STEM instruction through robotics programs. We've held dozens of science day programs at local elementary schools. We host the Central Texas FLL Invitational for 2K attendees yearly. Our team also donated 4 robots over 2 years to establish a robotics program at Ranfontein School in rural South Africa.
Innovative Methods to Spread <i>FIRST</i>	2468 shares FIRST values on a huge scale through a close relationship with LEGO, notably through videos made for LEGO: an informative film for FLL, reaching 2K youth and another that premiered at CES 2013 introducing the EV3 Mindstorm to 140K experts. We continue a mentoring link in rural South Africa providing 4 LEGO Mindstorm kits, like the ones our Robotics 1 course uses. We work forums like TCEA and NI Week (each with 3K

teachers/experts), talking about how robotics boosts STEM proficiency.

Strength of Partnership

Partnerships allow our team to not only function as a FRC team, but as a full robotics program. We have recruited 10 sponsors who contribute funds, in-kind donations, and, most importantly, mentors integral to our success. In non-build season, our mentors provide weekly classes on technical and non-technical topics. Their devotion is reflected in the hundreds of hours they donate. Year round, we mentor and provide facilities and funding for 6 teams during their fall and spring competitions.

Communication Methods

Internally, our team utilizes Basecamp[®] for file sharing, communication, and project organization. In our school district, we use science days, robotics camps, back-to-school nights, and the STEP UP program to ensure hundreds of students know about robotics opportunities at every level. Locally, we present to thousands at TCEA, College and Career Fair, SXSW, and MakerFaire. Statewide and nationally, we reached hundreds of thousands via videos for LEGO and FIRST to inspire students at all levels.

Other Considerations

2468 has developed an innovative, student led initiative to garner sponsors. Like pitching for venture capital, our students have developed a presentation for executives to gain investment in growing college-ready STEM students in EISD. In six weeks the students raised over \$5,000 and In-Kind donations (i.e. a trailer); We anticipate achieving our \$15,000 target this year. Increased funding will allow us to expand our facilities to be able to support new FTC, FLL, and BEST mentored teams.

Main Essay

Chap Robotics, FIRST Team 2468 (Team Appreciate), began in 2007 with 35 determined students interested in STEM. After receiving the Rookie All-Star award at the Lone Star Regional, our overall program has grown to 129 students with 6 mentored teams in just 6 short years. Through efforts in partnership, outreach & curriculum development, we transformed the culture in our community & world to celebrate STEM in skill building, education & appreciation of the rewards of a STEM career.

To fuel our rapid growth, 2468 has built a progression network ensuring continued FIRST membership in our FRC team & throughout the District. Four years ago, 5 8th graders involved in FLL created an FTC team as a transition to FRC. With funding from our parents & nonprofit WESTA, & the use of our shop & experienced students, they joined the Chap Robotics family. They rapidly grew in numbers & achievement. Last year they became 2 teams & won the top 2 places at the regional qualifier & the Connect Award. Now, we mentor 4 FTC teams which, to date, 2 of our FTC teams have qualified for regionals with a 1st place Inspire & a Rockwell Collins Innovate award. Last season, we introduced robotics in our District's 2 middle schools. They used our shop & FRC members who operated complex machinery & demonstrated tool use. In fall's BEST Robotics, both teams

qualified for Regional Championships. One was the 1st middle school & rookie team ever to win a 1st place BEST Award (equivalent Chairman's) at the Capitol BEST Competition. Most of the 8th graders have now signed up for FTC next year. Reaching to elementary schools, FTC also mentors an FLL team whose members are likely to follow our network through FTC & FRC to STEM careers. This progression of FIRST involvement boosts STEM interest & leads a majority of alumni to such careers. A veteran member said "FLL, FTC, FRC - It's gotten to the point where I can't remember doing anything else. FIRST has been my life since 6th grade, & I plan it will be well after I graduate."

We give back to our District by reaching students with the FIRST message. Each of our District elementary schools hold annual science days for >300 students. There we inform younger kids of the wonders of robotics, pointing some to FLL. In STEP UP, we visit District middle schools & inform >700 teens of FIRST & our program. A resultant record number of 8th graders registered for Robotics 1/CAD classes next year. Even more signed up for FTC. To promote youth participation in FLL, we host local & regional FLL competitions, giving facilities, equipment, concessions, & volunteers. >2K compete annually, including FLL teams where our current (& likely future) members are from. Our video for the 2013 Central Texas FLL Invitational, "What's after LEGO?", reached 2K kids, showing opportunities in robotics through FIRST.

Outreach in our community takes many forms. In the last 2 Junes we gave Austin youth the opportunity to use LEGO Mindstorms at a camp organized/managed by an FRC member. Members/mentors helped with the camp, which 24 kids attended. Later we taught >20 Boy Scouts of robotics for a merit badge. To reach other high school students, we offered workshops as part of Texas Robot Roundup, sponsored by 2158. Our students/mentors taught other teams about Robot C, motors, gearboxes & the 6-week engineering process. At Skillpoint Alliance's College & Career Expo, as the only HS with a booth, we helped >3K students think of/prepare for their future. To inform educators, who then inform our community, we were invited for a 4th year to work the LEGO booth at Texas Computer Educators Association, talking with >3K teachers about how LEGO robotics builds STEM proficiency. This year, we will present at TEDx for local youth on FIRST Robotics. We also were invited for a 4th year to SXSW, where we were part of a reception for >500 at which Dean Kamen held a Q&A about FIRST with our bots as examples.

This fall, we became a national poster team for LEGO, demoing in video the use of new, innovative products, such as the EV3 Intelligent Brick at the Consumer Electronics Show (CES) with >140K attendees. 2468 members showed how the EV3 applies easily operated robotics to STEM classrooms & can be used to measure heat, pH & more. We support robotics on a global

level at the Randfontein School in South Africa, donating 4 LEGO kits & mentoring 2 students who, with the Global Literacy Project (GLP), developed a robotics curriculum. There was nothing similar in the GLP/school prior to our involvement & we were the only program ever asked by GLP to return.

When our 2008 Rookie All Star team started the program, they had only one robotics class available. Since then, we've won a variety of awards, from a Judges Award, to an Engineering Excellence Award & Entrepreneurship Award. We have consistently performed exceptionally in competition, recently becoming Dallas West Regional Finalists & Alamo Regional Quarterfinalists. Reflecting increased STEM interest, program membership grew 369% to 129 students. Our success has impacted our school's curriculum; from one Robotics class in 2007, we now have Robotics 1, 2 & 3 courses, teaching freshmen basics with LEGO Mindstorms & giving experienced members time to work on the bot in season & improve skills throughout the year. We also arranged to start similar VEX robotics classes at the middle schools next year. To grow related skills, many students enroll in an Electronics class taught by a mentor. This year, the mentor also received approval for a new class, 3D Design & Presentation that teaches CAD to students & helps them be Certified SolidWorks Associates.

To further extend the STEM message to other disciplines, we collaborate with Computer Science 2, 3 & 4 classes, where we recruit many of our programmers. They can move freely from their classroom to our lab during the season. Otherwise, they learn LabVIEW, the language our team uses. Together with the Physics department, from which our team started, students are offered a comprehensive pre-engineering program, attractive to both competitive tech schools & innovative STEM companies. As a result of these courses, >50% of our members select a college course of study in STEM. Our alumni have gone to such schools as the US Air Force Academy, CalTech, UT, WPI, Texas A&M, & Purdue. Through connections built in FIRST, graduates have jobs at GE, TI & Samsung. Some students have altered future plans & are at the forefront of STEM industries.

We greatly Appreciate the supportive relationship with our sponsors. Many have been with us for 3-6 years: TI, NI, Time-Warner Cable, Pixels & Verbs, FIRST in Texas & 37signals. Our newest sponsor Berry Consultants joined just 3 weeks ago through our innovative fundraising initiative. Initially our school district funded our shop and program with a budget of >\$70K. Today that funding is only \$6K. While the main cost of our bot is time, devotion & sweat, it takes capital to support us & 6 mentored teams. This year we were \$14K under in funding. To increase sponsorship, we started a student-led sponsor recruiting contest, already finding a \$5K sponsor and received In-Kind donations (i.e. a trailer). Winners get scholarships (\$500/\$250) & iTunes credit. The contest has a Coopertition rule; referrals to family businesses must be done by unrelated members. We try to give back to sponsors by

representing their philanthropy. We have been part of NI Week many times, with a booth, panel discussion & demos in the LEGO robotics area. To repay our FTC teams' sponsor Dell, we participated in Dell Demo Day, showing off our FRC/FTC bots. For our District, who gave initial funds, we present at many STEM-supportive events, from annual science days at elementary schools, to STEP UP at middle schools. We even presented to the school board on development & advice for a middle school robotics course.

Our mentor relationships are the most cherished, for they inspire us to success. From Coach, as he is known throughout FIRST, to Scott & Joe, members on the FRC control systems board, mentors provide 1000s of hrs of time in a season, equal to funds greater than what many sponsors give. Often they work with students all night. They teach us to build, CAD, program & more. In Mr. Cooper's words, "students give back something missing in the workplace. An energy that's excited to engineer. They ain't doing a job; they're feeding a passion."

Of our strengths, we take the most pride in our vigilant adherence to Gracious Professionalism, Coopertition & the general FIRST spirit. Coopertition is one of the most important facets of our team. As Coach says, "In FRC the goal isn't for us to win, but for all individuals involved to be inspired/motivated. Coopertition allows us to compete at a high level, at the same time knowing that others will help us to go to another level. We are fortunate to have the resources we have, & it is very important to our team to help other teams that may not be as fortunate. Coopertition creates an environment of support, challenge & success for all teams." We take pride in promoting other teams at competition, even those we compete against. At competition we send ? of our students/mentors to offer expertise/tools. At 2012 Dallas West Regionals, we helped Team 2613 wire, program, build & pass inspection. President Robert Ly noted "there were times in the day when more of our team members were in 2613's pit than in ours." At Alamo Regionals, our biggest impact was with our rookie year mentors, 2158. We fixed technical problems with their bot, allowing their advance to semifinals where we respectfully bested them.

Time improves and expands our promotion of STEM. From mentoring 15 students last year we now mentor 68. Last summer we showed 20 scouts LEGO Mindstorms; This fall we demonstrated the EV3 to >140K experts at CES. Our Appreciation for FIRST will continue to spill into the entire community, fueling a bright future.

Pictures



