



STEM Academy Cyberwolves Business Plan

2011-2012





STEM Academy Cyberwolves Business Plan

2011-2012

Table of Contents

Section 1 Introduction

- 1.1 Executive Summary
- 1.2 Mission Statement
- 1.3 FIRST Robotics
- 1.4 Additional Competition Adventures
- 1.5 Program History
- 1.6 Central Texas STEM Foundation

Section 2 Goals

- 2.1 Overall Program Goals
- 2.2 Continued Goals
- 2.3 Current Goals
- 2.4 Projects
- 2.5 Integration Class Support

Section 3 Management Plan

- 3.1 General Organizational Structure

Section 4 Financial Plan

- 4.1 Team Budget
- 4.2 Income



Section 1 Introduction

1.1 Executive Summary

The STEM Academy at Robert M. Shoemaker High School (SHS) in Killeen, TX participates in several co-curricular competitive programs as Cyberwolves. Robert M. Shoemaker High School is located outside the gates of Fort Hood, one of the largest military installation in the world. The local community primary employers are US Army, Killeen Unified School District, and medical community. The majority of our team members have had a parent deployed as part of America's War on Terror. Though US Army Operation Test Command provides engineering mentors to our team members, many of these men and women are frequently unavailable due to the current operations overseas. Addition mentors in local community are contractual with the US Military and subject of transitional change frequently.

Our campus and student population at SHS is unique in that over 65% of the population is associated with the US military. In addition, the population has mobility due to this military concentration population. The community of Killeen established due to US Army military base Fort Hood. Many of our team members have been impacted by parent deployment. Parent deployments, in many cases, have been for two or three tours of duty overseas in Iraq and Afghanistan. In 2009, our community learned we are not except from terror attacks as we witnessed, firsthand, an act of terror on Fort Hood.

The local community is represented by a highly ethnic and diverse population. Our campus population is approximately 2200, of which, 52% qualify for free or reduced lunches. Forty-five percent of the students are classified as economically disadvantaged and over 70% are classified as at-risk students. Many SHS students are the first generation in their families to attend college.

The focus of SHS STEM Academy is to promote technology and encourage student enrollment in STEM related curriculum and co-curriculum. The Academy focuses also on recruiting under represented students such as females and minorities in STEM related careers with emphasis on engineering.

Since 2001, US FIRST Robotics has been implemented into our after-school robotics program. In the beginning, participation in the after-school program consisted of approximately 10 students. Currently, our after-school program is co-curricular and exceeds 45 students. The Killeen Independent School District's



STEM Academy Cyberwolves Business Plan

2011-2012

Board of Directors recognized the impact that US FIRST Robotics and engineering had upon our students and approved the STEM Academy at SHS. The Board of Directors also adopted Project Lead the Way (PLTW) engineering based curriculum and courses. The school Board in 2009 approved innovative robotics courses on our campus. Since its inception, the STEM Academy has created new curricular and co-curricular opportunities for SHS students that reflect the academic and curricular goals of the Federal and State governments. In the 2011/12 school year, the STEM Academy has approximately 300 students enrolled in engineering and robotics courses.

The curricular and co-curricular program provides opportunities for our students to work in team projects and develop problem-solving skills. Our curricular and co-curricular programs remain active in a continuous process of maintaining current in all curricular and co-curricular materials, equipment and practices to stay at pace with the global advancements in technology. The STEM Academy curriculum implements and integrates our students in the participation of hands on, project-based activities making connections to real world applications. Project-based activities will increase our students understanding in the design, development and engineering process. We integrate BEST robotics and FIRST Robotics with their real world applicable projects into our engineering classes.

The STEM Academy curriculum integrates robotics and engineering challenges that allow our students the ability to participate in project-based, hands on learning activities utilizing real world applications. The integration of the competitive activities allows our students to develop skills through applicable engineering activities to gain knowledge in the design, development, and engineering process. Cyberwolves our co-curricular organization participates in FIRST FRC, FTC, BEST, TCEA, VEX, and MATE underwater robotics. The STEM Academy plans to inspire our students to achieve their academic goals and dreams, now and in the future through the implementation of additional STEM related co-curricular academically challenging competitive projects such as in the US FIRST Robotics Competition invention design and Autodesk animation awards. In addition, students will engage in multiple off-season design events in the summer of 2012.

1.2 Mission Statement

To provide the co-curricular competitions, events and activities to build academic foundation and technical skills in the competitive arena that will enable students to thrive in a career in a science, technology, engineering or mathematics related field.



STEM Academy Cyberwolves Business Plan

2011-2012

1.3 FIRST Robotics

The Cyberwolves have been building robots for the FIRST (For Inspiration and Recognition of Science and Technology) competition since 2001. In that Rookie year, retired General Robert M. Shoemaker supported Cyberwolves. General Shoemaker was instrumental in securing a mentor partnership with U.S. Army OTC engineering. Today, Cyberwolves have 40 students of the STEM Academy that actively participate in FRC and FTC teams.

2001: Cyberwolves rookie robot, Bodal was created to play the game Diabolical Dynamics. The strategy was to cap and pull goal posts and pick up large balls using a four-wheel drive.

2002: Cyberwolves second year they made Combat for the game Zone Zeal. Combat was made to grab goals to position them into the scoring area.

2003: Cyberwolves made the M647 for the game Stack Attack. M647 was made to get to the ramp first, knock down the other team's stacks, push their bins in the scoring zone, and defend their stacks.

2004: Cyberwolves made the M647A4 for FIRST Frenzy: Raising the Bar. The M647A4 was made to hang from a 10 ft high bar, and also to position mobile goals.

2005: Cyberwolves made Tremendous for Triple Play. Tremendous was made to cap tetras quickly play defense when need, had a 13ft reach a 3-speed shift, and a worm drive arm.

2006: the Trogdor was made for Aim High. It was made with a human loaded ball shooter that was able to shoot from the ramp, and be a strong defensive robot.

2007: Rampbot was made to deploy a ramp and raise 3 robots, in addition to defensive.

2008: Liftbot was made to lift the large balls to over the playing field.

2009: Yellowbot was made to deploy balls up and shoot to the alliance trailers.

2010: Chupacabras was made to kick soccer balls and hang from a bar.

2011: Suiginator was designed to be a machine of reliability with precision.



STEM Academy Cyberwolves Business Plan

2011-2012

1.4 BEST Robotics Additional Competition Adventures

The Cyberwolves have participated in BEST (Boosting Engineering Science and Technology) since fall 2001. Cyberwolves initially participated at Capitol BEST and most recently participated at the new Heart of Texas BEST.

2001 RAD To the Core, Cyberwolves built robot to run on an overhead trac the robot was required to remove fuel rods from nuclear reactors and place them into a Multi-Tube Containment Vessel.

2002 Warp X, Cyberwolves built a robot a remotely controlled device that recovers game pieces from previous BEST games.

2003 Transfusion Confusion, Cyberwolves built a robot to collect blood cells and deposit the cells into a scoring area in the cell saver.

2004 Best Fever built a robot to use DNA components and place them into the appropriate sorting/scoring areas on the field.

2005 Mission to Hubble, build a Hubble space telescope by replacing old gyroscope/battery units with new ones that must be retrieved from a space Tug. Magnets hold the GBUs in place on both the Hubble and the Space Tug.

2006 Laundry Quandary built a device to retrieve “dry” laundry from clotheslines and place “wet” laundry on clotheslines within the 3-minute time limit.

2007 Robot Odyssey Build a cargo ship on the surface of Mars and place the supplies in a storage bins. Matches are 3-minutes long and played with 4 teams in each match.

2008 Just Plane Crazy built a robot to retrieve aircraft subassemblies and complete an aircraft from these components.

2009 High Octane build a robot to collect and employ common molecules (carbon dioxide: CO₂; and water: H₂O) and essential resources (energy, catalysts) to complete a series of chemical reactions.

2010 Total Recall build a product manufacturing operations on two independent production lines.

2011 Bugs built a robot to safely handle the bugs/ and or food. Carefully transport them from their current location to one of three containment areas.



STEM Academy Cyberwolves Business Plan

2011-2012

1.5 Additional Competition Adventures

2010 was the Cyberwolves rookie year participating in MATE underwater robotics program and successfully completed their mission. Cyberwolves participated in 2001 and will be participating in MATE robotics for the third season this year in the spring of 2011.

SHS mentors partnered with the local community college to establish the first FTC qualifier in 2010. SHS fielded four teams and in 2011 will once again participating in the FTC event.

Students began participating in the Texas Computer Educators Association Arena and Inventions competition in 2010. We have also fielded robotics teams at the Vex competition for the first time in 2009.

1.5 Program History

Robert M. Shoemaker High School participation in FIRST has helped establish a curricular focus program on our campus, science, technology, engineering and Mathematics (STEM) Academy. In 2000, when SHS opened the initial plan was a health services education directly related to the schools physical location near a hospital. Due to FIRST team 647's experience at the 2001 Lone Star Regional, our school board approved their proposal to develop a Science and Engineering Academy within the school. In addition we added the implementation of Project Lead the Way (PTLW) curriculum. The PTLW curriculum and FIRST have a symbiotic relationship. Students in the PTLW classes learn many skills and concepts that they apply to design and build our robots and the FIRST experience encourages students to enroll in the PTLW classes. Both state and federal laws, policies and incentives have established requirement for STEM related classes. These policies also encourage students opportunity for dual credit and advanced placement courses. Teachers, counselors, mentors and upperclassmen encourage our students to enroll in the most advanced classes and apply to colleges for STEM related degrees.

Our team members mentor elementary and middle school students with engineering concepts and robotics applications in both FLL and BEST. We encourage students to begin taking pre-AP classes in middle school and to take additional courses in summer school to provide time in their schedule for a greater number of science, math, and engineering courses. The FIRST experience helps our students exceed, not meet, local and national standards by giving them opportunities to apply and practice what they learn in advanced classes such as Physics and Calculus. We are especially proud that the



STEM Academy Cyberwolves Business Plan

2011-2012

Shoemaker students have some of the highest AP scores for the last four years and valedictorians have all been active team-members.

1.6 Central Texas STEM Foundation

Central Texas STEM Foundation a 501c3 established in 2008 by the mentors and teachers of FIRST team 647. To foster community appreciation, support and involvement, encourage business partnerships and participation, to solicit mentorship and financial support for the advancement of education and curriculum for the STEM programs in Fort Hood central Texas area. In addition, to further encourage student participation in local, regional and national competitions, provide emotional support through mentoring including any and all other appropriate means to promote their growth personally and educationally throughout central Texas for their success in today's world.

Section 2 Goals

2.1 Overall Program Goals

Cyberwolves will continue to integrate competitive robotics into the curriculum. Students will participate in FIRST FRC, FTC, VEX and BEST robotics competitions. In the next several years, our strategy is to improve our performance in all award categories. Cyberwolves will continue to improve the safety strategies and develop safety animation. We will Further development of additional communication tools including blogs, online project share environment and verbal interpersonal interactions. In addition, we will strengthen and further refine and develop our organization policy procedures and work together more efficiently. Fully documenting, updating, and creating organizational structure, charter and by-laws.

2.2 Continued Goals

- Inspire students in STEM
- Engage students in leadership roles
- Promote FIRST gracious professionalism
- Increase community and state awareness of STEM education careers
- Promote teamwork
- Introduce students to engineering role models
- Provide support and assistance to any FIRST Team
- Develop training in 3d studio Max and technology applications



STEM Academy Cyberwolves Business Plan

2011-2012

2.3 Current Goals

- Model program
- Design through engineering process
- Spirit always
- Dedicated students
- Fun, family environment
- Improved communication
- Focused effort
- Safety at all times

2.4 Projects

2011- 2012 School Year

Summer 2011	Begin summer program Tue/ Thur night 6-9 College for kids Engineering Camps conducted at CTC New Freshman Attend off Season Texas Round-up
August 2011	Parent/ Student Orientation SME Summer Camp Student Orientation Geekfest at CTC JC Penny Mall Day Meet the Mayor
September 2011	Football T-shirt Launcher developed with old FIRST ROBOT BEST Kickoff Waco, Texas Pancake Dinner Fundraiser Meet the Coaches night on the Football field
October 2011	BEST robotics competition Football continues
November 2011	Football FLL Qualifier at SHS high School Community booth and presentation at FLL
December 2011	Race into math and Science Nascar Ten 80 Education Develop Rudolph the Robot for Christmas Parade
January 2012	FIRST Robotics Kickoff Week 1: Design Development Presentations and Prototype Week 2: Build Base



STEM Academy Cyberwolves Business Plan

2011-2012

	School board Presentation and recognition Week 3: Build Manipulators Week 4: Finalize Construction Present at Timber Ridge Elementary
February 2012	Week 4: Drive practice/ Trouble shoot robot Audie Murphy middle school Live Oak Middle School Smith Middle School Palo Middle School Week 5: Drive tryouts Week 6: FIRST Exhibition for Community and District Week 7: Prepare for shipment and submit awards Week 8: Prepare for Competition Travel
March 2012	Elementary School Presentations Elementary School Presentations FIRST Dallas FIRST Lone Star
April 2012	International FIRST Competition MATE Robotics Competition NASCAR Robotics Competition
May 2012	Off Season Northrup Grumman Sponsored event STEM Academy Awards Graduation
July 2012	Summer/ program for students Off season competition

2010 and 2011 School year

Summer 2010	JC Penney's Invitational Managers Training July Fun at Belton Park Middle school robotics club partnership development Summer Manipulator Training CTC Camps Community Boys Club/ Girls Club Camp
August 2010	SME Summer Camp Student Orientation
September 2010	Parent/Student Orientation



STEM Academy Cyberwolves Business Plan

2011-2012

	Spaghetti Dinner Fundraiser/ BEST Kickoff
October 2010	BEST Robotics Waco Engineering Festival Field Trip Teacher/ Admin Conference at STEM – National Symposium and STEM National Science Festival Washington DC
November 2010	Beary Thoughtful Fundraiser TCEA Competition
December 2010	STEM Lab Clean up Days
January 2011	Kickoff Day: Rules day and Idea Development Week 1: Design Development Presentations Week 2: Design Commitment and Development Week 3: Design Finalize, Begin Construction/ Spirit and Chairman's
February 2011	Week 4: Construction/Spirit and Chairman's Week 5: Construction/Spirit and Chairman's Week 6: Construction/Spirit and Chairman's Ship and submit awards Week 7: Prepare for Competition Travel Middle School Presentations Audie Murphy Smith Palo Alto Live Oak FIRST Exhibition Day for community
March 2011	FRC Competition Alamo Regional
April 2011	FTC New Hub/ Partnership CTC FRC JC Penney's Dallas Regional TCEA State Competition MATE Competition
May 2011	Football Shooter Redesign Project Northrop Grumman Invitational off season event at SHS STEM Academy Awards Engineering Design Presentations



STEM Academy Cyberwolves Business Plan

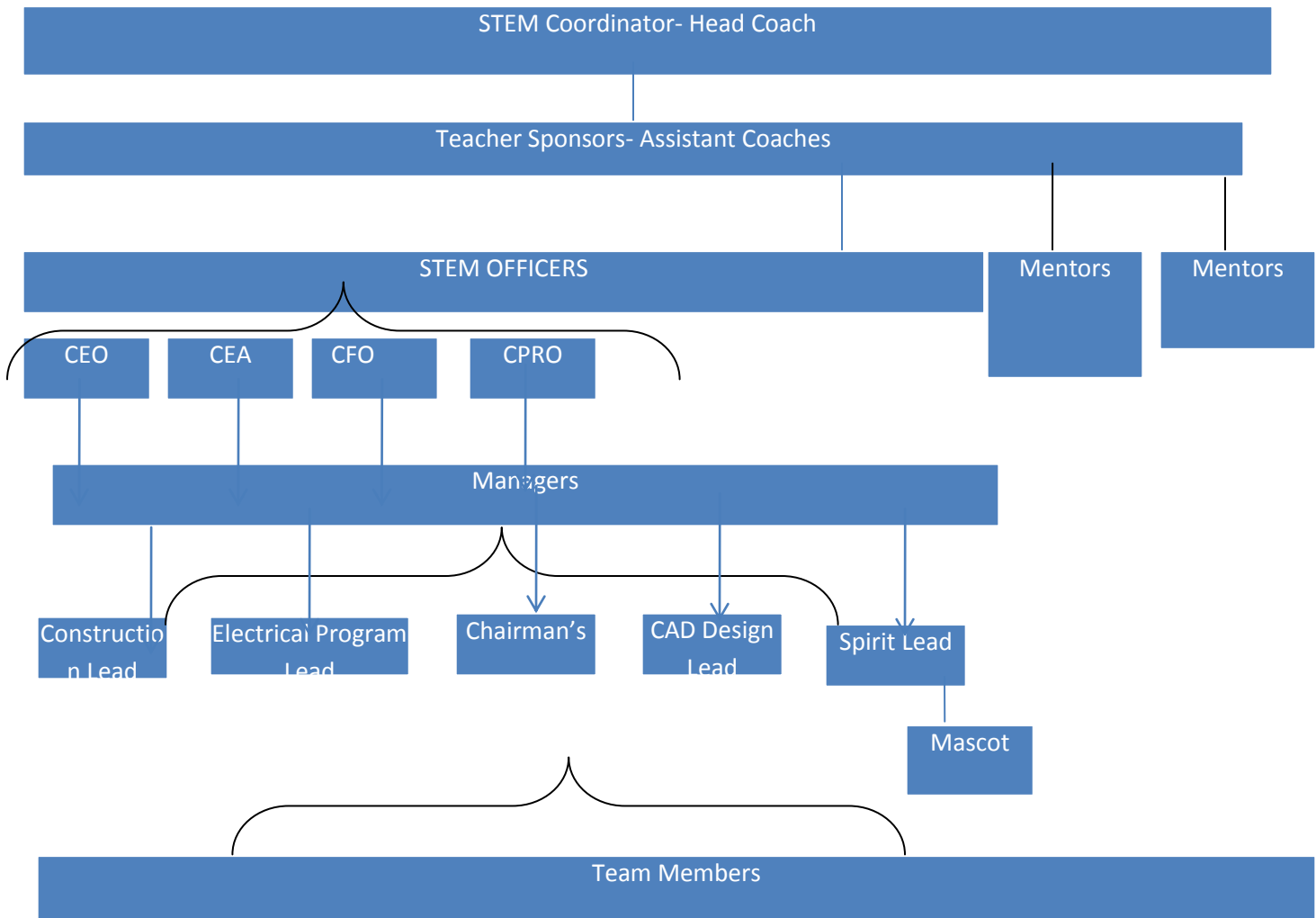
2011-2012

2.5 Integration Class Support

Electronics	Dr. Melendez
Computer Science	Mr. Melvin & Dr. Melendez
Engineering Design Development	Mr. Melvin
Rules/ Game Breakdown	Mr. Melvin
Introduction to Engineering Design	Dr. Melendez
Inventor Auto CAD	Dr. Melendez
Principals of Engineering	Mr. Melvin
Robotics/ FTC	Mr. Owens
Digital Interactive Multimedia	
3D Studio	Dr. Melendez

Section 3 Management Plan

3.1 General Organizational Structure





STEM Academy Cyberwolves Business Plan

2011-2012

Section 4 Financial Plan

4.1 Team Budget

Item	Annual Cost	Description
FIRST regional event registration	\$5,000	1 st event registration for <i>FRC event</i> includes the Kit of Parts
Travel expenses	\$3,000	Hotel and meals
Transportation expenses	\$3,000	Bus
2 nd regional event registration	\$4,500	2 nd event registration
Travel expenses	\$3,000	Hotel and meals
Transportation expenses	\$3,000	Bus
Robot materials expenses	\$4,000	Additional material costs
Miscellaneous expenses	\$2,000	Other expenses / T-shirts and incidentals
Total Annual Budget	\$27,500	

4.2 Income

- Students pay \$10.00 monthly dues & \$50 uniform costs
- Kickoff fundraiser dinners
- KISD STEM Budget
- Donation program/ T-shirt launcher and T-shirts
- Grants applications
 - Time Warner Cable Grant
 - Alion Science and Technology Award
 - JcPenny Grant
 - Northrop Grumman Grant