



INTRODUCTION



Team RUSH Mission Statement

To develop leadership skills and increase real world experiences in an exciting environment so that our members become leaders in a global 21st century knowledge economy dependent on math science and technology.

1.1 Welcome From **Team RUSH**

1.3 Reach Out...Ask Questions

1.5 Welcome To *FIRST*

1.8 Addendum 1.I: Letter to rookie teams from Kyle Hughes, coach, **Team RUSH 27** and *FIRST*'s 2000 National Woodie Flowers Award Winner

1.10 Addendum 1.II: Top 27 Reason why Every District Needs a *FIRST* Team

1.12 Addendum 1.III: Internet Resources

1.13 Addendum 1.IV: *FIRST* Inspiring Students.





Team RUSH (Respect Unity Spirit Heart) is based out of Clarkston, Michigan and has been participating in *FIRST* since 1997.

Through the years, we have gone through many challenging and rewarding times. We feel it is our responsibility to share what we've learned with other teams, especially the new rookie and younger teams. We hope that sharing our **Tool Kit for Success** with you will make building a sustainable, successful program a bit easier. Being a part of a *FIRST* team not only teaches students hard skills (math, science, engineering, machining) it also teaches soft skills (leadership, mentorship, time management, goal setting). *See Addendum 1.1 "Letter to Rookie Teams from Kyle Hughes, Leader, Team RUSH, at the back of this section"*

At **Team RUSH** we are hopeful that we can help you through your early years with the following **Tool Kit** sections:

- **Business** (includes team structure, calendar, continuous improvement, team development, communication, recruitment and recognition)
- **Financials and FUNdraising** (includes a sample budget and many fundraising ideas)
- **Sponsorship** (includes different approaches, sample cover letters and flyers)
- **Community Impact** (includes various suggestions at local level, for K-8th graders, and through the local Chamber of Commerce and Parks and Recreation)
- **Build Season** (includes a calendar from kick-off through robot ship, many resources, and specific hints from engineer mentors)
- **Competition** (includes checklist, guidelines for chaperones, pre-competition planning, awards and the necessary forms)
- **Parent Support** (includes many suggestions on how you can tap into this important resource)



NOTES

Everything in this **Tool Kit** is based on what we've found to make us successful. Many times the things we have learned are because of our mistakes or by trial and error. Please keep in mind that each team is unique and there is no one best way to run a *FIRST* team. **See *Addendum 1.11*** "*Top 27 Reason why Every District Needs a FIRST Team*" at the end of this section. This is a presentation *Team RUSH* students have presented to Michigan Educators and Superintendents to promote the importance of *FIRST* in the State of Michigan.

CRITICAL!!! Don't wait to review the ***build season*** "***THOSE CRAZY SIX WEEKS***" or the ***competition*** sections of the ***Tool Kit***. Many of the things contained within those sections are Important for you to know and to start working on as soon as feasible!

YOU ARE NOT THE ONLY ONE!! "I wish I could do my first year as a mentor over again! When I was traveling home after the championships in Atlanta I realized that even though I had been a part of an established *FIRST* team for 4 or 5 months I was just starting to 'get it'."

Fred Fox, mentor



REACH OUT... ASK QUESTIONS



Remember to visit other teams' websites and ask other teams for help! Talking to members of another team has helped **Team RUSH** students and mentors tremendously in understanding *FIRST* basics including the robot design process, build and competition. If you have any questions or need any help from **Team RUSH** please feel free to contact us either through our website, www.teamrush27.net or by emailing Shannon@teamrush27.net. For specific questions feel free to contact any of the mentors below. We will be happy to answer any questions you may have!

Team RUSH Mentor Contact Information

Tim Flickenger, taf2@chrysler.com
Advanced Electrical, Design, and Scouting

Fred Fox, ffox@schenckrotec.com
Mechanical Systems

Jim Holmes, jim.holmes27@gmail.com
Robot Build Team, Effectors and Pneumatics

Dennis Hughes, drh9@chrysler.com
Build Team Leader, Chassis and Drive Train

Kyle Hughes, hugheskh1@clarkston.k12.mi.us
Team Coach, overall

Steve Hyer, sjh@igdsolutions.com
Website and Community Impact

Steve Hyde, steve.l.hyde@gmail.com
Programming

Anthony Lapp, anthony.lapp@AAM.com
Robot Build Team, Above Chassis Systems

Shannon Moegling, shannon@teamrush27.net
Corporate Fundraising and Business



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In addition to the resources we share below you will find many other resources in **Addendum 1.III** “Internet Resources” at the end of this section.

Please fill out the EVALUATION found as the last page of this **Tool Kit**

Please be sure to check out:

www.teamrush27.net

www.usfirst.org

www.chiefdelphi.com

www.firstwiki.org

We hope that this **Tool Kit for Success** and its resources will be helpful.

Kyle H Hughes

Sam Maffey

DENNIS HUGHES



Stan L. Hyde

Anthony App

Timothy A. Flaherty

Fred Fox

Sam H



WELCOME TO *FIRST*

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Congratulations on choosing to start a *FIRST* (*For Inspiration and Recognition of Science and Technology*) Robotics team! *FIRST* is one of the most fun, challenging, exciting, and rewarding programs available to high school students.

“I attribute much of my success today to the lessons that I have learned through FIRST.”

Jason Markesino, former student, current mentor

What Is *FIRST*? Visit *FIRST*'s website at www.usfirst.org

FIRST was founded by Dean Kamen in 1992. Dean is a practicing engineer in the field of Medical Engineering, *FIRST*'s board members are past and current presidents/CEOs of BAE Systems, Xerox, Bausch & Lomb, Boston Scientific and many others. *FIRST* has garnered the attention and support of many in their quest to “inspire young people to be science and technology leaders.” They formed a partnership with Google to spread interest in science and engineering via YouTube. Former President George Bush, Sr., Governor Sonny Perdue of Georgia and Governor Linda Lingle of Hawaii spoke at the Championship Event this year. Over 2000 companies and 400 universities are involved in supporting the teams, including General Motors, NASA, MIT, Purdue, Bosch, Dana, Delphi, Ford, Chrysler, Lear, and many small community businesses. *FIRST*'s vision, mission statement, and core values are found on the inside front cover of the **Tool Kit**.

The Students

Being a part of *FIRST* is a life-changing, career-molding experience—and a lot of fun. *FIRST* mission is “engaging students in exciting mentor-based programs that build science, engineering and technology skills, that inspire innovation, and that foster well-rounded life capabilities including self-confidence, communication and leadership.” This year, over 30,000 students on over 1,500 teams will compete in 43 competitions. Teams come from Canada, Brazil, Ecuador,



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Mexico, Great Britain, and almost every U.S. state. The excitement that is instilled in these students about science and technology is phenomenal! **See Addendum 1.IV “FIRST Impact”** in the back of this section.



The Competitions

The Robotics Competitions are exciting, multinational events that team professionals and young people to solve an engineering design problem in an intense and competitive way. The atmosphere is very similar to a college spectator sporting championship. These competitions are the result of much-focused brainstorming, real-world teamwork, dedicated mentoring, project timelines, and deadlines. Each new game is revealed in January. Teams have six weeks to design and build their robot. This requires skill, creativity, and total dedication. They use teamwork to build the robot “athlete” they feel is necessary to be competitive. There is also an autonomous portion to each game. At the end of the build season the robots ship to *FIRST* and the competitions begin. Teamwork and strategy are key to winning; for each match, teams are grouped to work together against another set of allies.

FIRST and the Community

The opportunity that *FIRST* presents goes much further than the technical aspects. The most prestigious award that *FIRST* gives is the Chairman’s Award. This award honors the team that best represents a model for other teams to emulate and best embodies the purpose and goals of *FIRST* which are to **inspire greater levels of respect and honor for science and technology in today’s youth**. *FIRST* teams work together to promote this message and to expose the community to science and technology.

At left, Dean Kamen,
FIRST Founder.
President, DEKA
Research & Development
Corporation

Right, John Abele
FIRST Chairman.
Founder Chairman
Retired, Boston Scientific
Corporation



**Founder & Chairman's Letter,
excerpt from the 2007 FIRST Annual Report**

FIRST came into existence more than eighteen years ago, and our most mature initiative, the FIRST Robotics Competition, is approaching its seventeenth season. As we have progressed through our teenage years, we have experienced the wonders of growth and development and, at times, some of the associated challenges. Today, much like a student preparing for the last year of secondary school, FIRST is poised to take another substantial step forward.

As we examine the FIRST Community, the United States, and the world, we recognize the attributes of an environment nearing the "tipping point." There is a growing social wave of concern and commitment for our future, and many of those who share that concern also embrace the values of FIRST. "Rising Above the Gathering Storm," the report of The National Academies, articulated the need to increase the talent pool and sustain an environment of innovation. The broad-based response from government, business and education leaders indicates that concern for our future has reached a critical mass.

We see FIRST approaching the time in our development when the potential for growth is at its highest. This year, governors and members of Congress met FIRST teams in offices, workshops, and competitions. President George W. Bush brought the FIRST season to a remarkable conclusion by recognizing the achievements and contributions of FIRST's award-winning teams at The White House.

All of us in the FIRST Community are helping to build the momentum that can meet the challenges of the "gathering storm." We have the opportunity and responsibility as innovators and early adopters to attract new participants to the FIRST Community, share our knowledge, experience, and wisdom, and actively encourage students to engage fully.

Every year, we hear thousands of inspiring stories from individuals, teams and communities—stories of success made possible by the dedicated members of the FIRST Community. Thank you to all of the mentors, volunteers, sponsors, parents and team members for your continued effort and contributions as we enter our next phase of growth.

*Dean Kamen, FIRST Founder
John Abele, FIRST Chairman*

Finally and again GOOD LUCK and welcome to FIRST!

"FIRST takes a lot of time, money, and dedication...but when you see the students change right in front of your eyes – you understand why mentors come back year after year. FIRST is truly a life-changing, career-molding experience."

Shannon Moegling, mentor



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Addendum 1.1



A FIRST Robotics Team
For Inspiration and Recognition of Science and Technology

Clarkston High School
Clarkston Science Math & Technology Academy
6093 Flemings Lake Road
Clarkston, MI 48346

Phone: 248-623-3670
Fax: 734-254-7874

Dear Rookie Mentor,

WOW! There is much I want to tell you! You have just signed up for an experience that is not only going to change the students and the world around you, but also the mentors, your school, the community – but especially you!

FIRST is an incredible experience. 13 years ago, my husband, Dennis, and I volunteered to start a *FIRST* team. Little did we know the changes we would see! I was challenged with, “Why am I doing this?” My babysitter challenged me on the amount of time I was away from my children and my colleagues thought I was crazy!

Finally, after a few years it came to me. I want the world to be a better place for my three children and *FIRST* was the way I could do this. If I could inspire even one student a year to go out and do this, then I have contributed to a community ready to improve the world! REALLY!

You are going to inspire many people; those on your team and those who have the blessing to see your team grow! There will be times when your *FIRST* experiences darn near kills you -- but your own professional and personal growth will be exponential! In addition to “surviving”, the phrase, “that which doesn’t kill you only makes you stronger” has come to mind continuously throughout my *FIRST* experience.

Words of warning:

- **Start small.** Start with a few kids, the minimum dollars you need and set only a few key goals for your team to achieve success. DEFINE success. Create SMART goals (Specific, Measurable, Achievable, Realistic and Timely) that are realistic for you, your mentors and the students. I raise the bar each season!
- **Develop a continuous improvement system.** Document all you do so that next year you can make it better. You think you will remember. You won’t. A rookie year is like your wedding day...months to plan...and if it weren’t for pictures and video, you wouldn’t remember a thing! Our simple pluses and deltas continuous improvement system is documented in this book. We do this exercise after every meeting and event – we have found it to be a very effective, non-threatening method of improvement!
- **Gratitude for assistance.** I learned this the hard way ... the first year, our main sponsor set up a press release! I was excited to have a newspaper reporter in my classroom. The students and I had some photos taken, and were interviewed. I should have said thank you to our sponsor 100 times -- I forgot to do it once! Thank you became one of my core values. Appreciate ALL that is given to you. We have grown – 13 years later the students say thank you for the team. All of our thank you notes and letters are handwritten by the students.
- **Keep it simple.** You have heard this a million times throughout your life but if you have never really focused on this as a goal – do it now. Your first years are tough because of the learning curve. Keeping it simple will help you stay streamlined and focused. As you are successful achieving your goals, you can add more!
- **Don’t do it on your own.** I used to think, “If you want it done right – do it yourself”. WRONG! I am blessed with the best people around me. In fact, this document would



Addendum 1.1 Continued

NEVER have been written without the influence, pushing, patience and persistence of two of our team mom's. Kathryn and Kathleen have been a God-send helping us document what we do. This helps **Team RUSH** reach more people -- like you! Thank you, Kathryn and Kathleen!

In addition to parent support we have also built an unbelievably skilled mentor staff. Without the expertise of these brilliant men and women, **Team RUSH** would not be the team they are today. Your mentors are the foundation of your team -- trust them!

- **Do NOT be afraid to fail.** **Team RUSH** has failed so many times; we are uncomfortable if things go right! If we are going to fail, we have decided we will only do it once -- we learn our lessons. The three phases of our competitions are now: Thursday -- Fail faster; Friday -- Learn more; Saturday -- Focus and execute!

I'd like to share a story from 1999. Competing in the Chicago Regional -- Team RUSH's robot arrived 15 pounds overweight. Back in our shop we had to do an analysis of the materials, weights etc. When the team arrived in Chicago we had to take the robot apart, replace the parts and rebuild the robot -- on Thursday!

On our first match Friday, the robot moved 5 feet then the battery jumped out and onto the ground. We were dead. Our next goal was to make it across the field. Each round we upped our goal. At the end of Friday night, we were in second to last place! We were terrible! On our way out we noticed teams in the lobby comparing notes on each other. We didn't care ... we weren't going to make it to the finals -- We went back to the hotel and went swimming!

Saturday morning, we went into competition knowing we had to play three rounds, including our last match with Team #71 -- Beatty. We kept rising our goals and we started winning. By the last match, Brian Beatty said to me, "Kyle, I am glad we are finally playing with you because I didn't want to play against you anymore!" That was the highlight of my trip! We won with them. Beatty became the #1 seed; we were #9. They picked us to play with them and we WON the Chicago regional. So remember miracles happen. Small goals got us there along with the faith to never give up.

In a nutshell: Start small, define your goals of success, continuously improve, say thank you, keep it simple, don't do it alone, "fail faster, learn more, focus and execute" -- never give up!

This experience may be the toughest thing you ever do, but more than likely it will also be your most rewarding. You are making a difference in this world. You are inspiring young kids to pursue careers in math, science and technology. You are their inspiration, their leader and their hero. Don't be afraid to fail; be honest with the kids; remember, grandma is watching!

Good luck, new mentor. May the RUSH be with you as you move down this road. Remember, you are not alone ... we have all done what you are doing -- and we are here to help you. I hope I didn't scare you too much!

Sincerely,



Kyle Hughes
Mentor/team leader of Team RUSH
2000 Woodie Flowers Award Winner

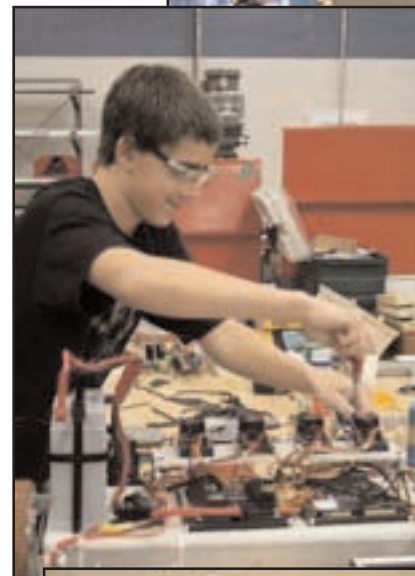


Addendum 1.11

The excerpt below was taken from a Team 27 RUSH presentation on WHY every district should have a *FIRST* team. Presented to Michigan School Administrators in 2008. These points may be helpful in your efforts to garner district support for your team.

TOP 27 REASONS TO HAVE A FIRST ROBOTICS TEAM

1. Students learn **BUSINESS** and **JOB SKILLS** – time management, leadership and public speaking
2. Positively impacts **COMMUNITY**
3. Expands science and math **KNOWLEDGE OUTSIDE OF SCHOOL**
4. Real life **ROBOTS** – hands on learning
5. Mentorships with real **ENGINEERS**
6. Inspires **TEAMWORK**
7. Develops a sense of **RESPONSIBILITY**
8. Students learn **BRAINSTORMING** and **PROBLEM SOLVING SKILLS**
9. Inspires students to choose **MATH** and **SCIENCE CAREERS**
10. Builds individual **CHARACTER** – encourages students to step out of their comfort zones.
11. Builds **SELF-CONFIDENCE**
12. **GRACIOUS PROFESSIONALISM** is taught and modeled
13. Be a part of something important – **SET GOALS** and achieve them
14. College **SCHOLARSHIPS**
15. Model importance of **MATH, SCIENCE** and **TECHNOLOGY**
16. **SAFE PLACE** for after-school
17. Students learn new and useful **ENGINEERING** and **LIFE SKILLS**
18. Connection with major corporations – **INTERNSHIPS**
19. Stimulates **LOCAL BUSINESSES** to support your program
20. **MEET PEOPLE** important in the world of *FIRST*
21. Have **FUN**
22. **COMPETE** in “High School sports like” regional competitions -- in math, science and technology
23. Build **SCHOOL SPIRIT**
24. **INTERACT WITH PEOPLE** of all ages from K-12 students to corporate CEOs
25. Teaches **INTERPERSONAL SKILLS** – how to get along with others
26. **BUILDS** on students existing skills
27. Models **ENGINEERING**



Addendum 1.III

INTERNET RESOURCES

What follow are the websites mentioned throughout the **Tool Kit** along with some additional ones that may be helpful.

Team RUSH www.teamrush27.net

FIRST www.usfirst.org

Specific Resource page of FIRST www.usfirst.org/community/frc/content.aspx?id=478

General www.firstwiki.net

Other veteran teams:

www.chiefdelphi.com

www.team341.com

www.cyberonics.org

www.boilerinvasion.org

Team Building:

FISH www.fishphilosophynetwork.com

Fundraising

www.dutchbulbs.com/resources/fundraisers

www.pizzakit.com

www.magicstu.com

Community Impact:

www.thedesertangel.org

Build

Sensors www.digikey.com

Circuits www.sunstone.com

Technical Sites

www.mcmaster.com

www.dynamicdrive.com

www.sdp-si.com

www.smallparts.com

www.onlinemetals.com

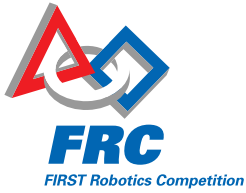
www.andymark.biz

www.firstcadlibrary.com

www.pneumticsfirst.org



Addendum 1.IV



IMPACT: INSPIRING STUDENTS

Improving young people's attitudes towards science and technology, and building self-confidence.

89% of FRC alumni reported an increased understanding of the role of science and technology in everyday life.

86% of FRC alumni reported an increased interest in science and technology.

89% of FRC alumni reported increased self-confidence.

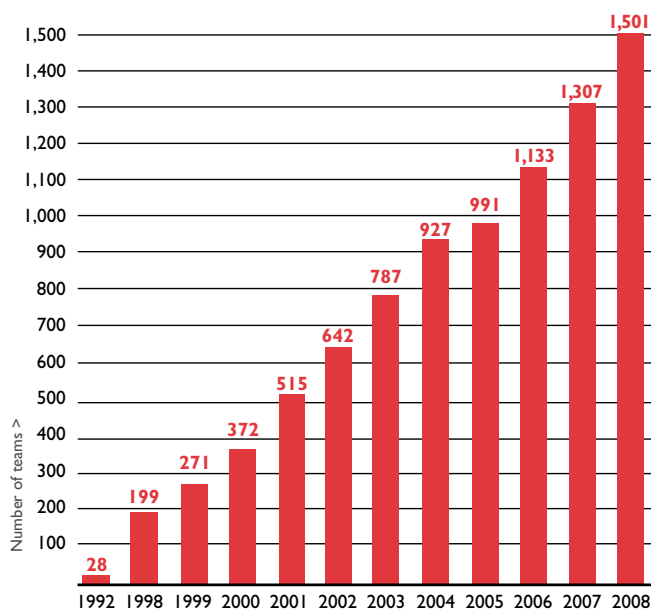
Source: Brandeis University Impact Evaluation, 2005

FIRST
200 Bedford Street
Manchester, NH 03101
800.871.8326
www.usfirst.org

Inspiring student interest and participation in science & technology

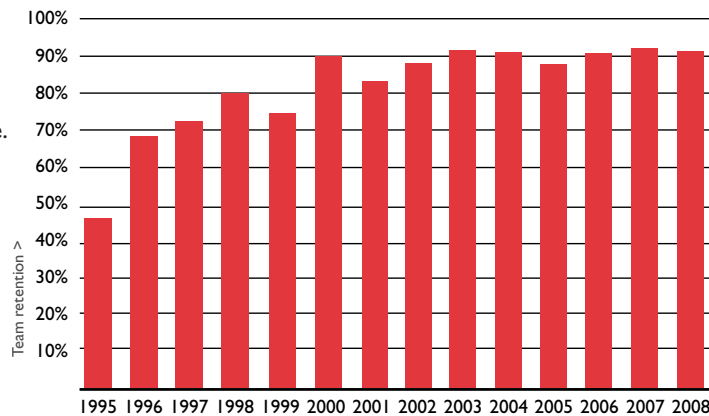
Over 37,000 high-school students engage in science and technology through the excitement, intensity, learning and fun of the *FIRST* Robotics Competition.

FRC Team Growth



FIRST Robotics Competition's team retention rate of 91% is evidence of the high quality of participant interest and experience.

FRC Team Retention



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