

## **Directions**

1. Read this document in its entirety. If you have any questions, please ask.
2. New students: Print pages 16 to 19 (Permission & Waiver Agreement, Student Contract and Student Information).
3. Returning students: Print pages 16 to 18 (Permission & Waiver Agreement, and Student Contract). Submit page 19 only if you need to update any information on that page.
4. Fill out the paperwork, sign (student and parent), and date.
5. Make sure **everything** is **LEGIBLE**.
6. Return all paperwork together at the next team meeting. Include a signed check for \$25 made out to “Westborough High School”. Write “Robotics” **and the student’s name** on the **lower left of the** check for reference.



# Redshift 4048: Team Handbook

## Revision History

<b>Version</b>	<b>Date</b>	<b>Author(s)</b>	<b>Changes</b>
0.1		Shreya Chowdhary	Draft
0.2	8/28/18	Louis Lung	Modified from initial version from Shreya
0.3	9/10/18	Louis Lung, Ed Burdick	Updated with split team and eligibility info
1.0	9/12/18	Louis Lung, Ed Burdick	First release for 2018-19 season
1.1		Louis Lung	Internal updates only
1.2.2020	9/2/19	Louis Lung	For FRC 2019-2020 season
1.3.2020	9/11/19	Louis Lung	Added Motto, updated forms to hand in

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# **Redshift 4048: Introduction**

## **FIRST & FRC**

Team 4048, also known as *Redshift*, is one of over 3000 teams internationally that compete in the FIRST Robotics Competition (FRC). FIRST (For Inspiration and Recognition of Science and Technology) is a 501(c)(3) non-profit founded by Dean Kamen with the goal of promoting STEM education in grades K to 12. FRC is the division of FIRST that targets high-school aged students (9th to 12th graders). FRC teams compete every year in a unique challenge designed by FIRST, with the goal of reaching the World Championships. FRC teams also strive to spread and embody the core values of FIRST.

FIRST also has other divisions targeted at other age ranges. They are FIRST Lego League Jr. (FLL Jr., for kindergarten to fourth graders), FIRST Lego League (FLL, for fourth to eighth graders), and FIRST Tech Challenge (FTC, for seventh to twelfth graders).

To learn more about FIRST, visit [the FIRST website at www.firstinspires.org](http://www.firstinspires.org).

## **Brief Team History**

Since its inception in 2011, *Redshift* has grown from 18 to about 70 students. We started at WHS, then moved our workroom to Gibbons Middle School, then came back to WHS. Along the way, we have competed at events at Revere High School, Worcester Polytechnic Institute, Boston University, Northeastern University, Bryant University, the MassMutual Center in Springfield, the XL Center in Hartford, and the America's Center in St. Louis. We've competed in the New England District Championships (2014, 2015, 2016), qualified (2015, 2016) and attended (2015) the World Championship.

We have won several awards, including the Xerox Creativity Award (2014), the Motorola Quality Award (2016), the Imagery Award (2017, 2018, 2019) and the Innovation in Control Award (2019). In the off-season we won BattleCry (2014).

In the Fall of 2016, we started hosting our own post-season event called *Bay State Brawl*. This continued in 2017 and 2018.

## **Mentors and Student Leaders**

*Redshift* is run by a group of mentors. Our mentors range from recent graduates of WHS to retired professionals. Within the student body, we enlist student leaders in all aspects of the team's operations.

*Redshift* prides itself on being student-led as much as possible. Mentors step in as needed. Students form the true backbone of the team; they build and program the robot. *Redshift's* student leadership structure is flexible and varies with the capabilities and the interests of the students. Our operational motto is that we work with who we have. This means that students are made leaders only if there is a match for that position. Mentors fill in the gaps to make the team run smoothly.

## Our Mission

1. **Educate:** Infuse students with a wide range of knowledge and skills.
2. **Apply:** implement what you learn via robotics competitions.
3. **Compete:** challenge yourself with Gracious Professionalism and Coopertition.
4. **Share:** Expand STEM education with others.

## Our Motto: “Aim High, Land Softy”

Aim high: We aspire to be better and do more. We set high goals.

Land Softly: But we don't crash and burn if things go bad.

Setting high goals gives us a target to aim for. But no matter where the trajectory of our flight takes us, we want to make sure that we cushion our landing.

## Student Benefits

Students benefit greatly from their FRC experience. What a given student walks away with depends greatly on their individual participation level. The more you put into the process, the more you get out of it. Here are some examples:

- FRC is **experiential learning** which is learning by doing. This is a trend gaining popularity in colleges and universities.
- Learn important **STEM skills** such as mechanical design and computer programming.
- **Apply science and math** taught in high school via the design and implementation of the robot.
- **Learn to fail** and to recover from failure. Failure is an integral part of learning but is normally not desirable in normal high school classes.
- FRC looks great on your **resume**. Colleges know all about FIRST and what it means to be on an FRC team.
- FIRST sponsors provide millions of dollars in **scholarships** annually. These are only available to FIRST students.
- Female students have free entry into the Society of Women Engineers.
- Students learn to prioritize their schedule, organize their thoughts, think on their feet, diagnose problems, generate solutions, speak in public, make presentations and plan events.
- Learn true **teamwork** where individuals depend on one-another.
- **Communicate** accurately, assess oneself and plan projects with peers.

## Team Fee

**The annual team fee is \$25 per student.**

FRC is expensive. We rely on the generosity of corporate partners in our area as well as a fee charged to each student on the team. Starting with the 2017-18 school year, the Westborough School District added Robotics to its list of activities subject to the school district's Activity Fee. In response we lowered the per-student team fee from \$125 to \$25 to reduce the financial impact on families. As you can guess, this has had a significant impact

on the operating income of the team. Teams across the country regularly impose fees of several hundreds of dollars. We will carefully monitor our expenses and hopefully will not need to raise team fees in the future.

One way to offset team fees is by raising funds. We need parents and students to contribute their time to look for fundraising opportunities. Help us make this team possible! See [Parental Involvement](#) for additional details.

# Team Season Calendar

All team meetings, except when otherwise noted, are held in room **A001 at WHS**. We also use A006, A007 and the woodshop as needed. Weekday meeting times are from **6PM to 9PM**. Weekend meeting times apply during the build-season; these sessions are about twice as long as weekday sessions. Details will be announced when known.

## Pre-Season

From September through December:

- **Classes** are taught to help students prepare for the coming competition season. New students are expected to take advantage of the classes to get up to speed.
- New team members must take a **first aid and safety class**.
- The team will participate in an off-season robotics competition. New students must participate in some manner.
- The team attends **outreach events**, like the *Westborough Education Foundation Trivia Bee* and the *Homecoming Festival*.
- **Meetings** are usually held Mon/Tue/Wed except for holidays.
- Second year students will participate in Savage Soccer at WPI. They will use their prior year experience to build and program a robot in this small-scale robotics competition.
- Veteran teams will help bring the new students up to speed. They will also participate in advanced and specialized projects as needed.

## Build-Season

From January to April is the team's build and competition season:

- **The first Saturday of January: FRC Kickoff.** This is when the challenge of the year is announced by FIRST. All students must attend the kickoff at a specified location, understand the game and read the game manual.
- **January to mid-February: Build time.** After the FRC kick-off, the team has over six weeks to design, build, program and test a robot and otherwise prepare for the competitions. Beginning with the 2020 challenge (Infinite Recharge), there is no longer a stop-work day. Teams may work on their robot until their competitions (subject to any rule adjustments after this manual is posted). Redshift will still impose a team Stop Work day that is similar to the old "6 week and 2 day" duration. The team will meet 5 days a week (S/M/W/F/S) except on holidays. Though students are expected to put in enough time to significantly contribute to the effort, they should NOT attend every day! Students should take advantage of the off-days (Tue/Thu) to get their school work done and still be able to contribute to the Team.
- **March through April: Competitions.** The team competes in two District Events in March. If we do well enough, we'll advance to the *New England District Championship*. Do well there and it's off to the *World Championship*.

## Post-Season

After the last official competition event in March or April, the pressure is off:

- More outreach events, like the *Spring Carnival*.
- Make changes to the robot hardware and/or software for post-season events.
- Competing in post-season such as *BattleCry* at WPI.
- Other side-projects.

## Being a Team Member

### Eligibility

Being a member of *Redshift* is a **privilege**. Being a member is also **commitment**. If you don't think you can handle the commitment necessary to be a member of *Redshift*, do not join. Likewise, if you are a member of *Redshift* but no longer have the time, that's ok. Just tell us and we'll remove you from the Team. You can always come back the following year. It's better to remove yourself from the team than to be asked to leave!

All students must remain in good standing at all times – see expectations later in this document.

The Team does a lot of work. We work hard and we play hard. As a member of the Team in good standing you are:

- Eligible to attend Championship Events.
- Eligible to attend District Events.
- Eligible to attend off-season Events.
- Eligible to be on the Drive Team in official events.
- Eligible to lead groups of students, projects, and other functions.
- Eligible to apply for FIRST scholarships.

### Working Groups

The team consists of multiple working groups, many of which are dependent on each other during the build-season. Experienced students often play multiple roles and migrate between groups. New students should work within one group to get a solid foundation on the team's operating process. Students are encouraged to try working in different groups during their tenure on the team to maximize their experience.

Here are some groups. We often add or remove groups on a need basis.

- Mechanical
- Electrical
- CAD
- Java
- C++
- LabVIEW
- Imagery & Spirit
- Web and social media

- Off-season competition
- Program Management
- Field Element
- Award Presentation
- Outreach and Public Relations
- Fundraising
- Scouting software

## Competitions

A full description of a competition Event is beyond the scope of this document. Below is a list of the type of roles students play at a given competition.

- **Drive Crew:** these students represent the team on the field of play by operating the robot and working with other teams.
- **Pit Crew:** these students are responsible for making repairs and adjustments to the hardware and software in-between matches.
- **Award Crew:** these students talk to the judges in the Pit. No other students should talk to judges.
- **Scouting Crew:** these students watch matches and talk to other teams. They gather data on team strengths and weaknesses. This data is used if we have to select partner teams in the playoffs.

# Student Expectations

## Year to Year

Students are expected to grow and take on more responsibility each year. The purpose isn't to punish anyone but rather to push the student along. Some students need the push more than others.

1. First year students of any grade are expected to learn and acclimate to the Team. Though a few students ramp up unusually quickly, it usually takes an entire competition season to get the flow of the team and develop strong skills. New students are expected to take Fall classes in order to learn and improve their skills and to make a serious effort during the build season to materially add to the overall Team effort.
2. Second year students are expected to participate fully and own tasks. They should now know what a full season looks like and what it entails. Students who did not show *sufficient interest* in their first year may not be invited to return to the Team. Students should also take classes if it's necessary or advantageous to do so.
3. Third year students are expected to do a lot of work that materially benefits the team's readiness for competitions. Students who did not show *sufficient participation* in their second year may not be invited to return to the Team.
4. Fourth year students are expected to lead by example and drive the team to success. They are the role models for the younger students. Students who did not show *sufficient contribution* in their third year may not be invited to return to the Team.

You may have noticed that there are no metrics mentioned in the above list. How are you supposed to know if you are doing enough? The simple answer is that you will know. Students who don't show up know who they are. Students who show up but don't do any work also know who they are. Students who do useful work know who they are.

The different working groups can vary greatly in scope and requirements. As such posting an overall set of metrics that applies to everyone doesn't make sense. There is no one-size fits all plan. But be rest assured there will be requirements and expectations for all working groups.

Students will be rated on attendance, participation, competency and contribution.

## Priorities and Responsibilities

- **Your school grades** are your highest priority. Get your homework done first. Study for those exams.
- Since the team's work is shared across many individuals and there are often dependencies, if you are not available to work for the Team, you must let the Team know. Communication is important. Do not commit to work you can not accomplish. Learn to be honest with your self-assessment of both your capabilities and availability.
- You must understand the challenge and read the rule book. Be an expert on the rules.

- You must help clean up at the end of each meeting. We are **ALL** responsible for cleaning up; no one should leave early just because their ride is here. We should leave the room cleaner than it was when we stepped in.
- Students must arrive on time to all meetings.
- They must arrive and depart via the WHS front entrance unless otherwise directed.
- Students must stay for the duration of the meeting. If they need to leave early, they should inform the mentors.
- Students should have a team notebook or laptop to take notes as needed.

## Attendance

Attendance is taken throughout the year.

- You must attend *mandatory* classes and team meetings as they are announced.
- During the pre-season, students are expected to take classes to learn new skills. What classes to take is up to you but you are expected to take every class seriously, attend all sessions of that class, and apply what you learn.
- The build-season is short and we have a lot amount of work to do. **Students must attend a minimum of three (3) days per week, one of which must be on the weekend**, during this critical period.

## Constructive Participation

Being a member of the team means that every student is expected to participate in a constructive manner. Robotics is not a club you join and then hang out on the sidelines; *Redshift* is about experiential learning, which means in order to get the full experience and learn as much as possible, students must be actively contributing to the project they are part of on an ongoing basis. Participation must be positive and constructive and sustained; students who show up just to chat with their friends often slow down the work and that will not be tolerated.

Students are also expected to participate in activities outside of the robot build. This includes outreach events and any other projects as specified during the year. Students can also generate their own ideas for team activities. *Bay State Brawl* is the direct result of students wanting to create a new Fall off-season event. Mentors act as enablers to support the students and to provide a reality check; students should come up with ideas.

## Conduct

- Students should come ready to work and with a good attitude.
- All school behavior requirements apply. No bullying is tolerated, etc.
- Students may not roam through the school halls during meeting times.
- Show respect. Do not mistreat, damage, or touch things that do not belong to you. You will be working in classrooms off-hours and there may be other student's projects in the rooms we use.
- Be respectful. Listen when others are talking. Do not interrupt or have side conversations.
- Do not run, push and shove, play tag, etc, at our meetings. This s a key safety issue.

- Do not deface white boards, damage furniture, scribble on desks, or do anything that you know is wrong.

## Communication

Outside of meetings, the team communicates primarily via email.

- **The team mailing list** is [team@team4048.org](mailto:team@team4048.org). This mailing list contains students, parents and mentors. It is used for all general communication needs. Parents who do not wish to remain on the mailing list may ask to be removed. This is our primary means of contact. Make sure team email does not end up in the Spam folder
- The parents mailing list is [parents@team4048.org](mailto:parents@team4048.org). This mailing list contains parents and mentors and is intended for issues that are parents-only. This is barely used.
- We will use the student's WHS email address (student.westboroughk12.org Google domain) in our mailing list. This provides the best means of guaranteeing email delivery. Some email domains (yahoo, outlook) occasionally have email delivery issues with our hosting service.
- **Students must read their email daily.** Many of you have smartphones; please make sure you have your email available on your phone. Even if you are busy with homework, it only takes a minute to read an email.
- **Students must act on Action Items** when they are noted in emails.
- **Students must reply to email when asked to do so.** We have a large team and trying to get responses from everyone can be very time consuming. Read your email and reply when asked to do so.
- Each student has a **team forum** account. Our team forum is located at <http://www.team4048.org/smf/>. The purpose of the forum is to document and share information so that it may be referenced at a later time. It acts a log, diary and library of team information. You are expected to read the forum regularly and contribute as necessary.
- Software team members can have access to our *github* code repository. They must first create a free account on *github.com*.
- All students and parents will be added to the team's Google calendar.
- Students may be asked to use additional productivity tool such as Slack or Microsoft Teams
- All Team controlled accounts are removed/deleted if/when a student leaves the Team.

## Safety

- Working on and with a robot is dangerous and requires every student to be responsible and safe. All new students **must** attend a **safety class** before the build season begins so there is no ambiguity on the safety requirements.
- Students will not be allowed to use any tools without first taking a **shop class**. Even if you have prior experience, you must take this class in order to use the tools.
- You are expected to follow all safety requirements including proper attire, proper footwear, and proper behavior.
- You will **always wear safety glasses** in the workroom.
- Failure to meet safety rules is **grounds for removal** from the team.
- **Safety requirements and rules are not negotiable.**

## Gracious Professionalism and Coopertition

It's important to adhere to two guiding FIRST principles: gracious professionalism and coopertition. Both terms essentially mean that students should be good sports during competitions; that students should be respectful to other teams as well within their team. Competitions are very exciting and fun events; not only do you sometimes get to miss school for the competition, but you get the chance to meet other FIRST students and learn about their team and robot. Building positive bonds in the heat of competition, win or lose, is the hallmark of an FRC event. Teams and student learn to work and help one-another to reach common goals. Examples of gracious professionalism and coopertition include:

- Not booing or insulting teams in opposing alliances.
- Applauding all teams for their awards at competitions.
- Helping a team in need, whether by lending a tool or by answering a question or lending a hand.
- Respecting other team's materials and pit.

# Parental Involvement

Our team would not work without the support of the parents. There are many ways that parents can help:

- **Be a mentor:** You don't need special skills to be a mentor. You already know so much more than any student that any and all knowledge you have is a benefit to the team. The only real prerequisite is being able to work and communicate with teenagers and other mentors. We will guide and train you as needed. All mentors must fill out a CORI form for a background check.
- **Weekend meals:** We work long hours on Saturdays and Sundays during the build-season. There will be an online signup sheet for parents to bring in meals on each weekend day.
- **Fundraising:** Help us raise money. FRC is expensive. We are supported by many local businesses but fundraising still needs to be an ongoing activity.
- **Corporate Grants:** Many companies support activities such as FRC. Sometimes it's a grant you have to apply for. Other times it's a grant they'll provide if you put in some of your time. Please check with your employer!
- **Extra set of eyes:** We welcome parents who have the time to sit in during our build sessions. Having an extra set of eyes to make sure that everyone is safe is a great asset for the team.

If you've read this far, congratulations! It's time for a quiz. What is 678-136-7092? Bring your answer to the kickoff.

Bonus question – what is 3614 in the world of Dr. Who?

# **Permission For Students Participating On Robotics Team And Indemnity & Waiver Agreement**

I/We, \_\_\_\_\_ and \_\_\_\_\_, parent(s) / guardian(s) of \_\_\_\_\_ (hereinafter my/our "child") having a date of birth of \_\_\_\_\_, the student participating on the Robotics Team, understand and agree to the following:

1. I/We affirm and understand that the Westborough Public School Parties, referenced herein, include the following: the Town of Westborough, the Westborough Public Schools and their (both the School's and the Town's) respective officers, directors, employees, agents, School Committee members, elected officials, appointed officials, superintendents, principals, administrators, personnel, staff, teachers, successors, contractors, subcontractors, vendors, insurers, and assigns.
2. I/We warrant and affirm that I/we am/are the sole legal guardian(s)/parent(s) of my/our *child* and am/are solely authorized to enter into this Agreement.
3. I/We understand and agree that nothing contained herein creates any obligation or duty on behalf of the Westborough Public School Parties that would not otherwise exist absent this Agreement.
4. My/Our *child*, may, from time to time, participate in the activities of the Robotics Team. For the purposes of this Agreement, the activities in which my/our *child* participates shall be called "Robotics Team Activities".
5. I/We understand and agree that the Westborough Public School Parties make no representations or guarantees regarding the quality, safety or availability of Robotics Team Activities, equipment used in connection with Robotics Team Activities, supervision of Robotics Team Activities, or transportation to and from Robotics Team Activities.
6. I/We understand and agree that Robotics Team Activities may be potentially dangerous and may lead to personal injury.
7. I/We have been made aware of the rules and requirements relating to the Robotics Team Activities in which my/our *child* will be participating and agree that my/our *child* will abide by and comply with all rules and requirements imposed now and in the future.
8. In consideration of the Westborough Public School Parties' sponsorship of Robotics Team Activities, and for other good and valuable consideration, the receipt and sufficiency of which is acknowledged, I/we agree as follows:
  - a) I/We, on my/our own behalf as well as on behalf of my/our *child*, my/our respective agents, successors, spouse, co-guardians, and assigns, forever waive and forfeit all rights whatsoever that I/we now hold, or may in the future acquire, to assert claims of any nature whatsoever against the Westborough Public School Parties arising from or in any way related, directly or indirectly, to my/our child's participation in Robotics Team Activities.
  - b) I/We, on my/our own behalf as well as on behalf of my/our child, my/our respective agents, successors, spouse, co-guardians, and assigns, shall indemnify, defend and hold harmless the Westborough Public School Parties, from and against any and all losses, liabilities, damages, claims, liens, and/or demands of whatsoever kind or nature sounding in contract, tort, statute or otherwise, arising from or in any way related, directly or indirectly, to my/our child's participation in Robotics Team Activities, alleged or pursued by any third party, whether entity or individual, at any time. I/We agree that this indemnity provision shall be interpreted as broadly as the law of the Commonwealth of Massachusetts permits

and that it expressly obligates me/us to indemnify and defend the Westborough Public School Parties, including costs and reasonable attorneys' fees, and hold them harmless from any and all claims relating in any way to my/our *child's* participation in Robotics Team Activities.

9. I/We certify that I/We have read and understand the foregoing paragraphs and agree with all of the provision contained within them.

**NOTE – SIGNATURES OF ALL PARENTS AND GUARDIANS ARE REQUIRED.**  
(if there are more than two parents/guardians, please contact the school for an additional signature page)

PARENT/GUARDIAN NO. 1:

Signed subject to the pains and penalties of perjury this \_\_\_\_\_ day of \_\_\_\_\_, 2019.

\_\_\_\_\_ and \_\_\_\_\_  
Name (please print) Signature

Relationship to Child: \_\_\_\_\_

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PARENT/GUARDIAN NO. 2:

Signed subject to the pains and penalties of perjury this \_\_\_\_\_ day of \_\_\_\_\_, 2019.

\_\_\_\_\_ and \_\_\_\_\_  
Name (please print) Signature

Relationship to Child: \_\_\_\_\_

# **Student Contract**

## **Student Acknowledgment**

I have read this document in its entirety and understand what is expected of me. I understand that this is a contract between me and the Team and I will abide by this contract if I am to remain on the Team.

Student's Full Name (please print legibly) : \_\_\_\_\_

Student's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **Parent Acknowledgment**

I have reviewed this handbook with my child and understand the commitment that will be required.

Parent's Full Name (please print legibly): \_\_\_\_\_

Parent's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

## **Student Information**

Fill out and return this page ONLY if you are a new student on the team or if you wish to change existing information previously submitted. Email addresses are used in the team mailing list. Phone numbers are used in case of emergency. T-shirt sizes are for team shirts.

**!!! PLEASE PRINT LEGIBLY !!!**

### **Student information:**

Student Name (First):

Student Name (Last):

Student Phone Number:

Student School Email Address (@student.westboroughk12.org):

Student non-school Email Address (optional, backup email contact):

Gender (M/F):

T-shirt size (S/M/L/XL – adult sizes):

Grade (9/10/11/12):

Other clubs, teams, classes, etc. that require your time. Give What and When (ex: Math team every Monday):

### **Please include information for at least one parent/guardian**

Parent/Guardian Name (First):

Parent/Guardian Name (Last):

Parent/Guardian Phone Number:

Parent/Guardian Email Address:

### **Second parent/guardian (optional)**

Parent/Guardian Name (First):

Parent/Guardian Name (Last):

Parent/Guardian Phone Number:

Parent/Guardian Email Address: