



# CREATE Jr. Coach's Manual

2011 / 2012 Version

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# The CREATE Mission

To inspire and prepare the youth of today to become the engineers and scientists of tomorrow.

**This will be done via competitive robotics competitions that are:**

**Compelling** – Competitions will include both sports-like (head-to-head) competitions as well as engaging social interaction through teamwork and alliances. A signature event will be held annually to reward and celebrate teams' accomplishments.

**Accessible** – By use of re-usable robotic kits/components, low annual and tournament registration fees, and costs structured to reward schools/programs with multiple teams, we will help ensure cost is not a barrier to participation. Tiered events and activities will be offered that make hosting events accessible to any size school or group.

**Inspiring** – Robust challenges and tournaments that keep students engaged throughout the year, are educationally rich and give appropriate focus to mechanical and electrical engineering. All participants will be surrounded by others aspiring to live up to the Values of CREATE.

**Safe** – Careful selection of equipment and focus on proper safety procedures will insure all participants have a safe environment to compete in.

## ***"Honor by Design"***

### **- CREATE Values**

**Honest** - Do "what's right" when no one is looking.

**Competitive** - Always give your best. Be humble in victory and gracious in defeat. Be respectful of your teammates, coaches and mentors, competitors, judges and spectators.

**Collaborative** - Act in the best interest of the team's goals and be supportive of each other. Share knowledge, tools and parts with other teams.

**Leader** - Encourage, praise, involve, and constructively challenge your teammates.

**Professional** - Works hard, determined, overcomes obstacles and is well trained and acts in a professional manner.

## Coaches Pledge

1. As the coach, everything you do communicates values. To the best of my ability I will try to model “Honor by Design” at meetings, build sessions and competitions.
2. I will lead by example and expect my team to abide by the rules of any/all competitions we participate in.
3. The students come first. Our shared objective is to inspire and prepare through a program that is fun and exciting. Success is measured by how many students get excited about science and technology.
4. The students do the work and make the decisions. The students on my team will do all the research, design, problem-solving, building, programming and decision making. (Coaches are to facilitate and lead. As such coaches are encouraged to help the students find the answers and solutions.)
5. I understand that the competitions I attend are hosted by volunteers and will treat them with the respect and gratitude they deserve. I will make sure all team members understand that the competitions they attend are run by volunteers and will encourage them to be respectful and appreciative as well.
6. I will be responsible for reading all e-mails that are sent to me by CREATE and will forward all pertinent information to team members and parents of team members.
7. I will make “Honor by Design” an important part of my team.

## Building a Team

### **The Foundation**

You will need to direct the process the team uses to solve the game challenge without providing the solution yourself. In addition, you must be willing to acquire some basic knowledge of robot building. You may want to enlist the support of a technology teacher or technical mentor for additional assistance. You may want to invite other people with diverse backgrounds to share their knowledge and experience with your team.

### **Advice for Coaches**

Enjoy the experience. Your goal is to help your students have fun with robotics. Whether or not your team wins a trophy at a competition, team members achieve success by participating.

### **The Students**

Teams of three to five members work best. The game is aimed at fourth and fifth graders, but younger students with the right skills may also participate. Teams can be formed in any environment and need not come solely from a school environment.

### **The Mentors**

Mentors help provide valuable one-on-one interaction and serve as resources in their specialties. Here are some possible mentor contributions:

- Engineer – Teaches the necessary skills for the robot’s design while demonstrating the engineering design process.
- High school or college student, preferably a VEX Robotics Competition member. – Helps the team work through a practice challenge, shares strategy, serves as a role model.

# Registering a Team

Go to [www.vexrobotics.com](http://www.vexrobotics.com) to register your team(s). For 2011-2012 registration is FREE. See the separate document titled “CREATE Jr registering a team” for instructions. You will receive an official VEX team number such as C999A. This is used for tournament registration (described below). You must have an official VEX number to register for tournaments. You need to have a team name for the registration process. Some teams use their school as the name. Many teams get very creative in the team name. Names such as Cheesy Poofs, Green Eggs, and Bionic Bears are often used. Have fun with your team name. Your name is announced at tournaments during competition. “Match number 12, on the red side we have team C999A, Mr. Spock and the Vulcanators.....” may sound more exciting than “Match number 12, on the red side we have team C999A, Generic school name.....”.

## The Coach

As a coach, you need to be involved, but you cannot allow yourself to take over the process, except when it comes to safety issues. Teach students to stop and think before they cut or bend metal, or do other similar tasks. As a coach, you may help everyone gain the most from this experience if you do not do the actual robot planning and building yourself. As much as you might like to build the robot, the team must design and build the robot with only limited assistance from you or other adult mentors.

Instead of telling the team to use smaller wheels from the kit, you could ask the team to brainstorm ideas to make the robot go slower. A successful coach controls the process, not the content. You are a facilitator, available to help your team complete the work and improve the way it works together. Students become problem solvers by finding solutions themselves, but coaches can assist young people best by facilitating problem-solving and helping students to reach their own solutions.

**Note:** CREATE Jr. is aimed at younger students. They may need more help to understand, design, and build.

## The Team

Discuss duties, time commitment, meeting times, and dates up front. If students cannot make a reasonable number of meetings, you need to know that. The level of commitment should be generally the same among all team members.

### Roles and Activities for Team Members

#### **Building:**

Make decisions about building, and work to achieve consensus among team members on the mechanical design. Use guidelines for team brainstorming to build a robot that can accomplish the team’s desired goals.

**Robot Operators (2):** Any two student team members will operate the robot during each round at a tournament. Each round can have different drivers if you wish. Refer below to the Tournament Section.

**Engineering Notebook Documentation:** Engineering Notebooks are optional, but highly recommended. In the engineering notebook students record and document the entire team's thoughts, designs, decisions, actions, failures, and successes throughout the season.

**Pit crew:**

After each match, check that all nuts/bolts are tight, all needed adjustments are made to keep the robot functioning properly. Make up a checklist and go through it after each match.

**There are many other roles to fill. Your team will find its own identity as the season progresses.**

## Team Goals

Keep your team focused on their goals during the season and review after the competition. Robotics events provide excitement and recognition and celebrate each team's accomplishments. **The true goal has very little to do with winning medals or trophies.** If you can look back at the end of the season and say even one of the following, you have achieved the most important goals:

- We learned how useful and fun math and science can be.
- We did something we didn't think we could do.
- We respected and considered ideas from everyone on the team.
- We figured out how to manage time, deal with setbacks, or communicate ideas.
- We had fun!

## Safety

**Safety Glasses:** Safety glasses should be worn when working cutting or bending metal and at other times when appropriate during the build process. Safety glasses ARE REQUIRED to be worn by the drivers when operating the robots during a match. (The antenna from the controller poses an eye hazard.)

**Safety Concerns**

Students should be doing actual work on the robot at all times EXCEPT when it comes to power tools and other dangerous or risky tasks. This is where adults assistance is appropriate. Working with the students in this way is a great teaching moment. Don't just do it for them, explain and teach the students.

## Meetings

**Kickoff Meeting**

Have printed copies of manuals and graphics, rules of the new robot game, and playing field drawings. Brainstorm and come up with a game plan for the new season!

**Early Season Meetings**

Teach members how to organize the tools and parts according to your system or have the team agree on a system of its own. Label the locations for storing different items. Provide key printed information. Put student names and distribution date on each copy. Discuss the Engineering Notebook. Students will be proud of the contents because they will be sharing them with judges. Have a suitable notebook ready at the beginning of the season.

### **Ongoing Meetings**

Meetings during the season involve building, testing, re-building, and re-testing. Guide the students but do not take over. Be sure to allow time for clean-up and documentation at the end.

## **Robotics Environment**

### **Problem Solving**

Keep it Simple, Silly = KISS. In the engineering world, simple solutions are much more desirable than complex ones. The complex solution has many more places to fail, is more difficult to repair, costs more, and the operation is less intuitive. Students are sometimes drawn to complex solutions.

### **Robotic Design**

It is important to remember that:

1. Design is an iterative, ever-changing process.
2. Effective design involves making compromises.

**Robot Mechanism Design:** In addition to moving around the playing field, a robot has to manipulate various objects. What looks simple to humans can be extremely difficult for a robot. In the early stages of the season, coaches often hear the team say, —We will simply pick up the gizmo and zoom over there and dump it. Reality quickly sets in after the team begins to experiment with the game and begins to understand the difficulty involved.

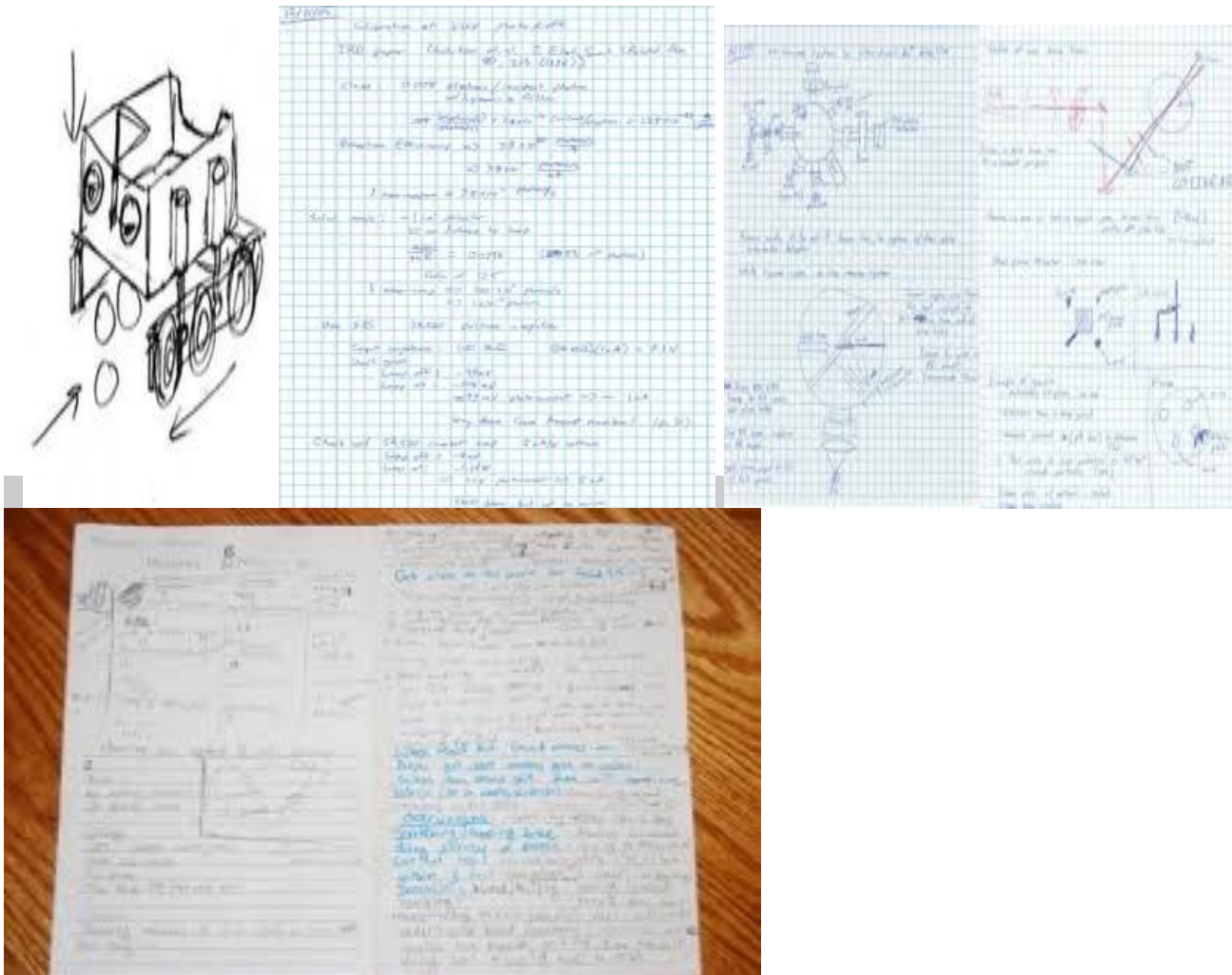
## **What is an Engineering Notebook**

The Engineering Notebook is the story of the journey that a team makes during the phases of the problem definition, concept design, system-level design, detailed design, test and verification, and production. The notebook should be written by the team, not the coach. Throughout the building of your robot, you will come across obstacles, lessons learned, and the need to draw things out on paper. This is where you and your team will use an engineering notebook, which will follow your team from kickoff throughout the competition. Judges will review your Engineering Notebook to better understand your journey, design, and team.

### **The Notebook Itself**

Organize your Engineering Notebook so an outsider will understand your team and journey. Record all designs and changes to your robot directly into your notebook. Include details and sketches if possible. Make notes and calculations in your notebook.

## Notebook Examples



# Tournaments

Competition takes place at tournaments held locally and throughout the region. These are usually held on Saturday mornings and last about 5- 6 hours. Details for each tournament vary. You can find tournament information and register for tournaments on [www.robotevents.com](http://www.robotevents.com) under the CREATE section. (<http://robotevents.com/robot-competitions/create-foundation>)

## Registration Process

Before you participate in a tournament you must register for the tournament at [www.robotevents.com](http://www.robotevents.com). (<http://robotevents.com/robot-competitions/create-foundation>) This is usually done weeks or months in advance. Your team may register for more than one tournament in a season. CREATE may limit the number of tournaments any one team can enter in the area in order to give all teams a chance to participate in a tournament during the year.

## **Tournament Registration**

When your team arrives at the tournament, the first stop is the registration table. Here, your team will be checked in, drop off their Engineering Notebook (optional), get information on the schedule, and find out where the pit is located.

### **Inspection**

The next step after registration is inspection. Your team cannot compete until your robot has passed inspection. The robot is checked for size, safety, and so on. If there is a problem, the team must return to your pit, correct the problem and be re-inspected. Don't worry. The judges, other volunteers, and even other teams will help you get your robot ready to pass inspection.

### **What to Bring**

Sometimes, tournament organizers will send you an information packet prior to the tournament which will include some helpful hints on what to bring and what NOT to bring. In general, you need to bring your robot, controller, spare parts, extra batteries, tools, a power strip or extension cord, the Engineering Notebook, and enthusiasm. You may also want to bring some snacks and water. Most tournaments provide concessions.

### **Pit Area**

The Pit area is usually in a large room such as a cafeteria or gym. The team may be instructed to find a table to use or may be assigned a specific table for their use. Power outlets will be nearby. This is your team's 'home base' for the day. This is where your team works on the robot, charges the batteries, and so on. The pit area is a great place to talk with other teams as well.

### **Competition Floor**

Arrive early for your match and be ready to go. There can be only two students in the driver's box for each match. Each driver drives for approximately half the match. All other team members and coaches may watch the matches with the audience. When it is your team's match, they will be instructed to go to the field and set the robot in the starting position. Once the match is over, the team should wait until the referee gives them the OK to remove the robot from the field. They can then return to the team pit for any needed repairs, tweaks, or to rest.

### **Judging**

Judging takes place in a formal manner once the team is registered and inspected. You will be given a schedule of where and when to go for your team's judges interview. During the interview, your team explains their creative process, shows off their robot, answers questions and generally gets the opportunity to shine. Informal judging takes place during the entire tournament. Judges and other tournament officials observe teams all day. Both the formal and informal judging is the basis for several awards at the end of the day. Always do your best, even when no one is watching.

### **Tournament Day**

Local tournaments and the U.S. National Robotics Championship Tournament follow the same basic schedule. After arriving, the team must register and get the robot inspected as described above. You will receive a Judge's Interview schedule. Attend the interview. Once checked in, the team sets up their pit and works on their robot (there always seems to be something to do).

Next comes a Drivers / Coaches meeting which is a short presentation about the competition and the venue. This is followed by a question and answer session. This is your opportunity to get all your questions answered. Do not hold back because you think the question may be a dumb question. Chances are that many other teams are wondering the same thing. There will be an opening ceremony lasting 5 to 10 minutes. A welcome is extended to all teams, the schedule is reviewed, logistics are explained, schedules are passed out and so on. Next, the Qualification Rounds begin. Each team will be scored in the same number of qualification matches, usually between four and six rounds. Find your team on the schedule and note which matches you will compete in. You may be in Matches 3, 7, 18, 22, and 35 for example. There are two robots on the field in each match. You will note that your team will be partnered randomly throughout the qualification rounds. Be sure to have your team talk with their partners sometime prior to the match to determine strategy, strengths, weaknesses, etc. Teams work together to score points. The final score of the match is given to each team. At the end of the Qualification Rounds each team will have a point total from all of their qualifications matches combined. A team ranking is published based on these scores. The finals of the tournament consist of two matches. The top two teams will partner for one match and the teams ranked third and fourth will partner for one match. The higher score of these two matches determines the tournament champion (two teams). The final portion of the tournament is the awards ceremony.

## **Awards**

Awards are given to the tournament champions (two robots) and sometimes the tournament finalists (two robots). There is an award for engineering excellence and one for overall team performance as well.

## **Qualification for National Competition**

Check with tournament organizers to see how many teams a tournament will qualify for the US National Robotics Tournament.

# Coaches Manual

## Highlights

**Now that you have read the entire Coaches manual, here are some guidelines and other things to remember:**

### **Coach / Lead**

Your job is to organize the team, get the kids started, and then let them take over.

There is no adult division. This is a student-driven activity. Keep parents involved, but when it comes to doing the actual work, adults should keep their hands in their pockets.

Encourage kids to try different ideas. If it doesn't work, re-build it into something else.

90% of progress comes in the last 10% of the time line. Deadlines of tournaments have a way of inspiring students, but try to get things done early so testing and small modifications can occur.

Practice. Practice. Practice. Drivers can never get enough practice driving.

### **Organize / Paperwork**

Get bins for parts. Fishing tackle boxes work well. So do small tool boxes. Set aside time at the end of meetings for clean up. Don't live in a vacuum. Talk with other teams/coaches.

### **Tournament Culture**

Tournaments are competitive. But this program's culture is one of sharing. It is common for one team to help another to get their robot working just before they compete against each other. We thank you in advance for helping this culture of cooperation and friendly competition continue to grow.

Talk with your alliance partners BEFORE you get to the field. Know what your "agreed upon" game strategy is for that match.

Failure is OK. Learn from it. Robots WILL break down. It's OK if something breaks. It usually breaks in an educational sort of way. Grasp this as a teaching moment.