

Los Altos Robotics FLL Coaches Training September 10, 2006

- **Welcome** Gordon Elder
- **The Basics** Gordon Elder
- **The Challenge** Gordon Elder
- **Competition Video**
- **Competitions** Gordon Elder
- **Robot Construction & Programming**
Austin Schuh
Travis Schuh
- **Michael Schuh's Coach's Guide** Michael Schuh
- **Questions & Round Table Discussion** All



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What you need

- A team of 4-8 kids; 9-14 years old
- Location: need to choose a home to meet at. It is best if it is always the same location so the board remains undisturbed.
- Table: order 4'x8' table from Los Altos Robotics (or build it yourself)
- Challenge kit
- Robot kits: at least one but it is best to have one for each two kids
- Laptop Computer(s): need to be reliable but performance is not an issue.



The Way This All Works.....

- FIRST LEGO League provides the structure and rules of the competition.
- Local parents and volunteers set up, organize and run the competition in a way that is fun and fair, adhering to the FLL rules.
- Los Altos Robotics was set up to run the Los Altos competition(s).
- This training provides information about the local competition and our *advice* on how you can organize and coach your team.



MINDSTORM RCX vs. NXT

NEW THIS YEAR

- Teams can choose between using the customary MINDSTORMS RCX Kit and the new MINDSTORMS NXT



MINDSTORMS RCX

- Used for all previous FLL tournaments.
- Control by the familiar yellow RCX “brick”
- Programs are downloaded through an infrared (IR) link.
- Programmed with two visual interfaces
 - RCX Code
 - ROBO LAB



MINDSTORMS NXT

- Rotation sensors integrated into the motors.
- Programs are downloaded through a USB cable.
- NXT “brick” is “studless”; there are no lego studs on it, only Lego technics connections.
- New programming interface: LabVIEW, similar to ROBOLAB.
- Requires 800Mhz Windows XP (there is a workaround for slower machines) or 600Mhz PowerPC Macintosh



Season Timeline

- 8 weeks to design, build, program and test
- Challenge revealed on September 15
- Local scrimmage Oct 15th
- Local competition Nov 18th
- State tournament in January at San Jose City College



Parent Involvement

- Coach: the guide, project advisor, project manager, not hands-on challenge solver - leave it to the kids.
- Asst. coach: supports coach in prep time and team meetings.
- Team manager: helps with team organization, meeting scheduling and other admin activities.
- Guest session by experienced team: It's OK to ask for help, especially helpful for new teams. More than once during the season may be helpful.
- Volunteer to help out at the scrimmage and competitions.



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The Challenge

- The challenge announcement will be on September 15 on the FLL web page.
- The theme this year is “Nano Quest”

“FLL teams have been to space, searched the oceans, and explored ways to help humankind. We now zoom from the world we know, through a super high-powered atomic microscope, to the strange world of individual atoms.”

- There are two parts the challenge
 - Research Project
 - Robot Missions



The Research Project

- The research project is an assignment related to the theme of the competition to:
 - Find a Problem
 - Find a Solution
 - Prepare a presentation (be creative!)
- The Research Project is announced as a part of the challenge. There will be a very detailed description and it will be related to this year's nanotechnology theme.



Research Project Presentation

- The project is presented at the competitions (not at the scrimmage) in a 5 minute time slot. Practice and time your presentation!
- Judges will ask questions about the project and will give a poor teamwork score if all of the kids are not involved and knowledgeable.
- The Research Project is strongly encouraged but some first year teams chose *not* to do a research project in order to focus and have fun on the robot challenge. This makes it difficult or impossible to win the “Director’s Award” because some points come from the research project. However, there are awards in many categories unrelated to the research project.



The Robot Challenge Kit

- The challenge kit is shipped to teams that have registered with FLL (a separate registration from Los Altos Robotics). It includes:
 - A 4' x 8' mat
 - The Challenge Kit; several hundred LEGOs.
 - A CD with the instructions for building the models (about 200 pages in color).
 - 3M Dual Lock Fasteners to attach the LEGO models to the mat.
 - There is a field setup guide announced with the challenge telling where and how to attach the models to the mat. It is important to do this properly and precisely so that your team missions attempts will work well on other tables.



The Robot Missions

- The challenge is a set of “missions” which are to be done by the robot on the playing field. Last year there were about 10 missions to be done in two minutes and thirty seconds which together could score up to 400 points.
- Read the 2006 challenge mission description carefully and interpret it literally. Don't assume anything. Your team needs to understand it.
- In a competition two tables are set side by side and there has been one collaborative or competitive mission. It looks like there is a collaborative mission this year.



The Rules

- You and your team should also read “The 2006 Rules” carefully. Note that any LEGOs are allowed, not just those in the robot kit. Electrical parts are the only thing that is restricted. Make sure that you know what electrical parts are allowed (only one “brick”, three motors, etc.)
- Make sure that you and your team understand and follow the rules for “The Base”. The base where the robot is launched from. There are penalties for touching the robot outside of the base.
- The score is determined at the end of the match, by the condition of the field at that time only.



Mission and Rule Clarifications

- Check back periodically to look for updates to the Q&A on the FLL web page.
- The “Rules” page tells how to email questions about the robot game part of the challenge. If you think that your robot strategy might violate the rules use this resource to get a clarification. This is the only reliable source for correct answers about the challenge. Answers are now posted for all teams to consider.

Check regularly!



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Competitions

The competitions are the opportunity for the kids to show what they have accomplished and put their robots to the test in a competitive environment.

- At the competitions each team will have a schedule for when they will run their robots, present their research project, meet with the judges, and do their three robot mission attempts.
- Each team will have multiple robot missions runs of two minutes and thirty seconds each (the time limit could change this year, check the challenge). They will compete with another team at an adjacent table to get as many points as possible. Team match ups are rotated so that your team will face three different teams.



Competitions

- There is time between runs (usually around ½ hour) to repair problems and there are practice tables available to help teams with last minute checks and practices.
- It is common for teams to have widely different scores from run to run depending on how well the robot performed that time. Don't let them get discouraged if they get a low score on their first run.
- Bring a computer (and extra batteries) to the competition in case you need to reload the programs. When using a MINDSTORMS RCX kit it is important to have a box that fully covers the robot and the IR tower to avoid downloading your programs into any other teams robot.

BE CAREFUL WHEN DOWNLOADING!



Competitions

- The coaches manual has a very nicely detailed section on “Awards and Judging Criteria”. Read it well before the competitions so that you and your team know what to expect.
- Volunteers are needed to make the competitions work. Parents from each team are expected to volunteer.
- For the Los Altos competitions the organizers has recruited and developed a number of judges but new ones are always needed.



Scrimmage

- The Los Altos Scrimmage is October 15 from 1:30PM to 4:30PM.
- Oak Avenue School and Covington School are the planned sites. Check the website later in the season to find out your teams scrimmage location.
- Your team should expect to be at the scrimmage for the full 3 hours; there is a lot to do and see.
- The scrimmage is an opportunity to learn how the competition works and see what other teams are doing.



Scrimmage

- Have your team ready to do whatever they can do. Many teams only attempt one or two missions at the scrimmage.
- The scrimmage is scheduled early in the season so that new teams really understand the local competition in time to prepare for it.
- Each team will have as many robot mission attempts as time permits.
- The scrimmage is not a full competition; there is no team judging or project presentation.
- Some informal awards presented on paper certificates.



Los Altos Local Competition

- The Los Altos Local Competition is November 18 from 1:15PM to 5:30PM.
- Oak Avenue School and Covington School are the planned sites. Check the website later in the season to find out your teams scrimmage location.
- Each team will have four robot mission attempts.
- Full competition judging and research presentations.
- Awards are paper certificates.
- Qualification for the state competition is awarded to the top teams.
- A fixed number of state qualification slots are allocated to Los Altos based on the number of teams competing in Los Altos and the total number of Northern California teams.



State Competition

- 64 Northern California teams met at the state competition in San Jose last year. This included six teams from Los Altos.
- Each team will have three robot mission attempts.
- There is a fee to compete in the state competition. It is run by volunteers but there are substantial expenses that are not covered by sponsorships.
- Lego Trophies are awarded to the top teams.
- The 2006 State Competition is not scheduled yet. Check the Los Altos Robotics or FLL web pages for updates.
- Teams that don't qualify to compete are encouraged to attend the state competition. There is no admission fee for spectators at any of the competitions.



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Your Goals for the Team

- Figure out what your goals are for your team.
- For me, my goals are for them to enjoy building and programming robots so much that they look forward to coming to the meetings and want to do it again next year.
- All teams should have fun and do their best.



The Research Project

- Work with your team to do the research project because they will get more out of the FLL experience if they do the project than if they do not. The FLL program is a rich program and the more that teams do, the more they get out of the program. The research project is an excellent opportunity for the teams to learn more about science and technology and get more out of the program. And by doing the project, they will increase their chances of winning the Directors Award.



Coaching Style

- Keep it fun for the team.
- I try to help children overcome hurdles that they have been stuck on for an hour or so. I make a few comments from time to time, but for the most part I stay out of the way.
- I encourage the children to take charge of the meetings and run them. This works better with older kids.
- I try to get other parents to let the children do the work. Let's face it, this robotics stuff is fun and it is hard for the parents to let the children have all the fun.



Things that have worked for me

- Begin each meeting with a review of what happened at the last meeting and what needs to be done at this meeting. Keep it short.
- Half way through the meeting and at the end of the meeting, I get the team to run against the challenge.
- Try to be positive. Try to keep a good ratio of good to critical statements.
- Use a timer to set up ten minute time slots to share the computer(s), robots, and/or the playing field.
- Teams need help understanding the time line of the competition season. Print out a simple calendar that shows all the weeks of the season with meetings, holidays, and competitions labeled.



More Things that have worked for me

- Try to get the team members to pick out one or two missions and own them. Then they are the ones that are responsible for doing all of the building and programming for that mission.
- At the competitions, only two team members are allowed at the table at a time. No coaches. Have the team members cycle through the missions. Child 1 does mission one and then child 2 trades places with her and does mission 2 and so on.
- A good schedule is to meet Friday evening or afternoon right after school and Sunday afternoon at 1:00 PM for 2 to 2.5 hours.



Things to avoid:

- Don't "help" the team see what is wrong with their robot so that they can fix it and score more points. Coaches and parents that do this end up putting a lot of pressure on the team and the fun goes out of FLL for the team.
- I have seen teams where the coaches know way too much about the robot. The coaches know the entire construction and programming of the robot. It is OK to help some; however, let the team members do the fun building and programming.



Problem Team Members and Parents

It is not uncommon for a team to have difficulty with some team members or overly helpful parents. Usually they respond well to clearly defined boundaries and the problems are quickly dealt with and go away. I suggest:

- Deal with them directly because bad experiences with fellow team members and coaches are high on the list of reasons children do not return for another season.
- Talk to the person one-on-one out of ear shot of the rest of the team or outside of team meeting hours.



Problem Team Members and Parents

- If problems with a child persist for two or more meetings, require one of the child's parents to be there to take care of the child.
- Have the child take a time out in another room or call a parent and have them taken home.
- If this does not work, remove them from the team. While this is not fun to do, it may make the difference between your child participating in FLL again next year or not.



Meeting Plans: Set Goals

- At the first meeting, have each team member and the coaches talk about what their hopes and goals are for the season and write them down.
- For the 2006 season, our team's coaches' hopes and goals are:
 - That the team works together through the entire season.
 - That team members take on leadership roles in team meetings.
 - That team members learn to work with each other and respect each other.
 - That all individuals feel comfortable with voicing ideas.



Meeting Plans: Set Goals

- Some of last year's seventh grader team members' goals and hopes were to:
 - Do well in competition(s).
 - Have a calendar showing team meetings and times.
 - Work together well.
 - Have a build schedule and follow it.
 - Have after-hour sessions and do them.
 - Have positive enthusiastic encouragement.
 - Have good kit organization and return parts where they go.



Meeting Plans: Getting Started

- After recording your team's hopes and goals and your robot kit arrives, go through the programming training lessons with the team.
- The team members usually love to put together LEGO kits and are usually very good at it. This can be a good break from the training exercises.
- Once the game is announced, September 15 for 2006, print out the game description and rules and go through them with the team.
- The FLL coaches guide talks about doing brain storming to come up with good ideas, but I have not had much luck with this. The kids can get frustrated if the coach wants to them to talk too much instead of working with the robot.



Meeting Plans: Ongoing

- Once you have made it through the training, exercises, building the playing field elements, and understanding the game and the rules, most of the meetings will be designing, building, programming, and test runs.
- Try and get the team to settle on a good base structure for the robot as soon as possible so that they can move on to design attachments and program the robot.
- Try to get the team to lock down their design a few weeks before the tournaments and run their robot over and over again to sort out the bugs.



Resources

- FLL Coaches Manual
- Michael Schuh's FLL Coach's Guide
www.losaltosrobotics.org (search on "Coach's Guide")
- FLL Coaching resources
http://www.usfirst.org/jrobtcs/flg_tm.htm
- The Minnesota FIRST LEGO League coaching 101 course <http://www.hightechkids.org> and follow this menu path:
Information->Training->FLL-HSR Downloads
(or google hightechkids 101)
- The Art of LEGO Design by Fred Martin
<http://www.usfirst.org/jrobtcs/ArtOfLEGO.pdf>



TigerBots Email List

- Contact Michael Schuh, Michael@LosAltosRobotics.Org, 650-965-8037 Home, 650-604-1460 Work.
- The **TigerBots Email List** is used for all Los Altos Robotics announcements. It is very helpful if at least one person from each family involved in FLL in the Los Altos area joins the Los Altos Robotics TigerBots yahoogroups.com email list.
- You can find out more about the list at <http://groups.yahoo.com/group/TigerBots>.
- Your email address will be kept private and not distributed outside of Los Altos Robotics board and coaches.
- To subscribe, simply send email to: TigerBots-subscribe@yahoogroups.com.
- If you decide to unsubscribe, email: TigerBots-unsubscribe@yahoogroups.com



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Questions

- Returning Coaches: What did we forget to present? What do you wish that somebody told you before your first season?
- New Coaches: What was confusing ?
- General Questions
- Closing Remarks



Backup Slides

- Not presenting the following slides but saving them for possible future use.



Meeting Schedule

- 2 meetings per week is recommended.
- About 2 hours in duration; less time is inefficient
- Schedule meetings to fit with other activities.
- Fri/Sun seems to work well. Example: Friday 3:30 to 5:30 & Sunday 1:00 to 4:00.
- Meetings may be more frequent closer to competitions.
- Coaches: add prep time to player commitment of 4-6 hours / week



Project Plan

- Make a weekly plan for season
- Track to plan
- Make adjustments
- Leave time for project and practice runs
- Perfection is not the goal -
predictability/consistency is the goal



Team Structure

- Divide and conquer
- Have kids work in small teams (2-3 kids) to accomplish specific tasks.
- Rotate tasks to give kids exposure to both robot building and programming.
- Pair experienced child with inexperienced child where applicable.

