

FIRST LEGO LEAGUE

JUDGES' GUIDE

POWER PUZZLE



TABLE OF CONTENTS

1. THANK YOU FOR VOLUNTEERING TO JUDGE FOR <i>FIRST</i> LEGO LEAGUE.	4
What is FIRST?	4
What is FIRST LEGO League?	4
The FLL Challenge.....	4
2. KEEP THE CHILDREN IN MIND	4
3. FLL JUDGING	4
Awards Eligibility	4
Robot Performance.....	5
Robot Design.....	5
Project Presentation	5
Teamwork	6
The Pits	6
The Competition Floor	6
5. JUDGES, JUDGE ADVISORS AND JUDGE ASSISTANTS.....	6
Judge Responsibilities	6
Judge Advisor Responsibilities	6
Judges’ Assistant Responsibilities.....	7
6. UNDERSTANDING FLL TOURNAMENTS	7
FLL Values and Gracious Professionalism	7
Gracious Professionalism	8
Adult Intervention	8
7. PREPARING TO JUDGE.....	8
Preparing for Interviews	8
Be Fair	9
During the Interviews	9
What to Expect.....	9
Team Dynamics.....	9
Deliberations	10
8. JUDGING, DELIBERATING, AND SCORING.....	10
Judging Process	10
Final Deliberations and Champion’s Award Determination	10
9. AWARDS DESCRIPTIONS FOR REQUIRED AWARDS AT CHAMPIONSHIP AND QUALIFYING TOURNAMENTS	12
Champion’s Award (not required at Qualifying Tournaments).....	12
Team Performance Awards.....	12
Power Puzzle Project Award (Depending on tournament, may be broken into three distinct awards.)	12
Teamwork Award	12
Technical Awards.....	12
Robot Design Award (Depending on tournament, may be broken into three distinct awards.).....	12
Robot Performance Award	13
Special Recognition Awards (Not required, but recommended)	13
Outstanding Volunteer Award	13
Adult Coach/Mentor Award	13
Young Adult Mentor Award.....	13

Optional Awards (At the discretion of the FLL Partner).....	13
Against All Odds Award.....	13
Team Spirit Award.....	13
Judges' Award.....	13
Universal Design Award.....	13
FLL Awards Hierarchy.....	14
10. ABOUT <i>FIRST</i> AND <i>FIRST</i> LEGO LEAGUE.....	14
11. FLL CHALLENGE PROJECT JUDGING MATERIALS	16
PROJECT RUBRIC	16
Project Presentation Questions.....	18
Universal Design Award (Optional Award – not given at all tournaments)	19
Project Score Sheets	20
Combined Score Sheet for Project	20
Project Score Sheet for Split Awards	21
12. TEAMWORK AND FLL VALUES JUDGING MATERIALS.....	24
TEAMWORK and FLL VALUES RUBRIC	24
Teamwork and FLL Values Questions.....	26
FLL Core Values	27
Teamwork Score Sheet.....	28
13. ROBOT DESIGN JUDGING MATERIALS	29
ROBOT DESIGN RUBRIC	29
Robot Design & Programming Questions	31
Robot Design Score Sheet – Combined Award	32
Robot Design Award – Split Awards for Dependability, Innovation, Programming	34
14. ADULT/YOUNG ADULT MENTOR JUDGING MATERIALS	37
Mentor Score Sheet	37
Adult/Young Adult Mentor Award Questions.....	38
15. TEAM SPIRIT JUDGING FORM.....	39
16. AWARD CANDIDATES MATRIX SHEET	40
17. TEAM INTRODUCTION PAGE	41
18. TEAM COMMENT FORM.....	42
19. JUDGING MATERIALS.....	43

1. Thank you for volunteering to judge for *FIRST* LEGO League.

FLL tournaments provide teams with an opportunity to showcase their achievements on the FLL Challenge. FLL believes that all teams who complete the Challenge are successful, and the awards represent the special achievement of particular teams.

What is FIRST?

FIRST (For Inspiration and Recognition of Science and Technology) was founded by inventor Dean Kamen to inspire young people's interest and participation in science and technology. Based in Manchester, N.H., the 501 (c) 3 not-for-profit organization designs accessible, innovative programs to build self-confidence, knowledge, and life skills while motivating young people to pursue opportunities in science, technology, engineering, and math.

What is FIRST LEGO League?

FIRST LEGO League (FLL) introduces 9 to 14 year-olds to the fun and experience of solving real-world problems by applying math, science, and technology. *FIRST* LEGO® League is an international program for children created in a partnership between *FIRST* and the LEGO Group in 1998. Each September, FLL announces the annual Challenge to teams, which engages them in authentic scientific research and hands-on robotics design using LEGO MINDSTORMS™ technologies and LEGO bricks. After eight intense weeks, the FLL season culminates at high-energy, sports-like tournaments. In 2006, over 80,000 children participated in 40 countries.

The FLL Challenge

Each year, we provide FLL teams around the world with an annual Challenge that has two parts: a robot game and a project. In the robot game, teams design, build, test, and program autonomous robots that must perform a series of tasks, or missions. In the project, teams conduct research and create a technological or engineering solution to an aspect of the Challenge and present that solution.

2. Keep the Children in Mind

The most important thing for you to know about an FLL tournament is that it is supposed to be FUN. *FIRST*'s mission is to get children excited about science and technology. If you experience any special challenges during the day, focus on that goal. Everything else will fall into place.

Also remember that these are children who worked hard all season to make it to the tournament. Treat their accomplishments and their work with respect, and be sure that other judges do as well. One negative comment from a judge can have a devastating effect on teams. Make it your goal as a judge to ensure that the teams know what they did well, and that they have a positive experience showcasing their achievements.

3. FLL Judging

FLL teams compete in four categories: Robot Performance (score on the playing field), Robot Design, Teamwork and Project Presentation. Teams that excel in all categories and demonstrate our Core Values are given our highest honor – the Champion's Award.

Judges are usually grouped in teams to judge the major award areas. Larger tournaments generally have several teams of judges for each award. Each pair or group of judges should see between ten and fifteen teams during the course of the day. More than that, and we find that judges start to lose the differential between teams. Within this range, we find that the judging process runs more smoothly, volunteers and teams have an easier day, and the event stays on schedule. Judging sessions are at least ten minutes long, including questions and answers, with several minutes between sessions for judges to evaluate and score teams. Check with your tournament organizer to determine how your event will be scheduled.

Awards Eligibility

Award distribution is spread as equitably as possible among the teams, with no team winning more than two awards (Champion's, Robot Design, Robot Performance, Teamwork and Project Presentation). A team can only win a second award if one of the awards they win is for Robot Performance.

Awards given to coaches and mentors do not apply to the team's eligibility for an award. In addition, FLL teams are only eligible for awards at the first Championship tournament they attend. Teams who compete in more than one Championship tournament do so at the tournament organizer's discretion, and for the fun of competing.

Robot Performance

Robot performance is score-based, and is judged by FLL Referees. The Referees score according to the condition of the field at the end of the 2 ½ minute round. Referees use the Challenge Mission, Rules, Field Setup and Question and Answer materials to guide their scoring.

This award goes to the team whose robot achieves the best score on the competition field, or in the elimination round, at the tournament. There are several options judges use to determine the winner:

- If no elimination round is held, the team with the single highest score from one of three rounds receives the trophy.
- If elimination rounds are held, the team(s) whose robot achieved the highest score in the elimination round receives the trophy.
- If elimination rounds are held, the highest scoring team (using high score between two teams as the factor for advancement to the next round) receives the award.

If elimination rounds are held, participants are the top teams according to each team's single highest score after three robot performance rounds. Scores may not be averaged or added together.

Robot Design

Robot Design is a judged award based upon the mechanical design and programming of each team's robot for the robot game portion of each year's Challenge. Technical judging begins with an interview with each team to discuss the design and programming of their robot. Technical judges should have a background in mechanical design and/or programming. Pairing judges with different technical backgrounds can be an effective way to ensure that judges have the required knowledge to choose the winners.

Interviews take place in a separate judging area, which should include an FLL Challenge table with a field setup kit. This 4 x 8 table allows judges to observe robot action, and discuss robot design and programming challenges and choices with the FLL team. Many tournaments require that teams bring a printout of their programming to the technical judging sessions, so that judges can review the team's programming during this interview. Some tournaments require that teams do a technical presentation, followed by questions and answers; others use a question and answer format for the entire session. Your tournament organizer will tell you what format your technical interviews will use.

Judges for the Robot Design category should have adequate knowledge of both the LEGO MINDSTORMS product and the Challenge missions, scoring and rules.

Project Presentation

Part of the annual FLL Challenge requires teams to identify an existing problem in the scientific specialty related to the Challenge, and find a solution to that problem. Then teams must share their findings and their solution with others. At tournaments, these presentations are done for the Project judges. Teams are given at least five minutes for their project presentation – including setup time. This time is followed by a question and answer period. Teams may perform a skit, a PowerPoint presentation, songs, or choose another creative way to share their project solutions. The project presentations are judged on the creativity of the presentation, the innovativeness of the project solution, and the quality of the research. These interviews take place in a separate judging area, and the tournament organizers set guidelines for what audiovisual aids can be used.

If possible, FLL recommends that some of the project judges have a background in the scientific specialty related to the Challenge. Teams spend at least eight weeks on this project, and they appreciate it when the judges acknowledge and understand their research.

Project judges should be familiar with the FLL Challenge Project assignment.

If the optional Universal Design Award is given, it is judged during the Project Presentation judging. The Universal Design Award is given to the Challenge Project solution that best incorporates universal design principles, ensuring accessibility to all.

Teamwork

Teamwork judging is usually done in one of four ways: as a question and answer interview session with the judges; by floating judges, who observe teams in action during the course of the day or visit teams in the pits; by observing teams doing a hands-on teamwork activity and then asking them questions; or by teamwork judges working in the technical and project interviews, asking teamwork-specific questions. Your tournament organizer will tell you what method they will use to judge teamwork at your event. In all cases, questions asked of the teams should cover both the tournament day and the entire season.

The Pits

The area that teams use as their home during the day is called the pit. Teams are usually given a table for their presentation materials, robot, laptop, and other materials. This is their gathering place for the duration of the tournament, and where they stay between robot competition rounds and judging interviews. This is a great place to meet with teams in an informal way, and see them in a more relaxed environment. It can be difficult to catch teams at their pit tables, as competition schedules are typically very tight, and the teams have little down time between interviews and robot rounds.

The Competition Floor

Robot rounds take place on the competition floor, on two 4' x 8' FLL tables, placed together to form one 8' x 8' competition table. Rounds last 2 ½ minutes, and are scored by referees. Teams typically have one or two practice rounds, and three competition rounds to complete during the course of the day. This is a great place to see the teams in action, and to observe how team members and coaches interact when they are focused on a goal.

5. Judges, Judge Advisors and Judge Assistants

Judge Responsibilities

1. All judges should review the following information prior to the event:
 - The Challenge description
 - The tournament schedule
 - Award descriptions and criteria
 - Technical judges should review the Challenge missions and rules
 - Project judges should review the Challenge project assignment
 - Teamwork judges should review FLL's Core Values statement
2. During the event, judges must:
 - Interview teams
 - In some cases, judges will also run the interview timer
 - Determine how individual teams performed, assigning them a ranking or score for their judged category
 - Note and report cases of adult intervention
 - Note and report demonstrations of gracious professionalism and FLL Core Values
3. During judging deliberations, judges must:
 - Determine the top ranked teams for their judging category
 - Work with judges of other categories to determine the Champion's Award winners
 - Share their notes on winning teams with the Judge Advisor for use in the Awards Ceremony script
4. If possible, judges should plan on attending the Opening and Awards Ceremonies
5. If head judges are assigned to each judging category, they will supervise deliberations for the awards in that category and coordinate their judging group's activities with the Judge Advisor.

Judge Advisor Responsibilities

1. The Judge Advisor is responsible for recruiting and training FLL judges for the tournament.

2. The Judge Advisor must also:
 - Confirm judging assignments
 - Coordinate schedules for judging sessions
 - Ensure that plenty of judging supplies are available
 - Review expectations for the day and the schedule with judges
 - Review the philosophy of FLL with all the judges
 - Facilitate morning meeting and oversee all judging areas.
 - Answer any last minute questions
3. Regarding awards, the Judge Advisor must also:
 - Oversee Head Judges for each category
 - Act as a liaison between teams and judges when questions arise
 - Confirm award winner determination deadline with the Event Manager
 - Identify any conflicts of interest on the judging panel, and ensure that judges with a relationship with a certain team do not take part in deliberations and award determinations for that team.
 - If callbacks are being used, work with judges to determine which teams are called back, work with Event Manager to schedule callback interviews.
 - Check with Volunteer Coordinator and Head Referee for input on teams, to be used during award deliberation.
 - Moderate the judging panel's deliberations on final awards.
 - Collect the judging sheets from judges and prepare list of award winners for Event Manager and Emcee, including full award description, judges' comments, and team name and number.
 - Oversee equitable award distribution
 - Receive the final *Performance Ranking* from the scorekeeper and enter the team name and number into Awards Ceremony script for the 1st and 2nd Place Performance awards.
 - With technical judges, assess final performance rankings for Robot Design awards, and ensure that Robot Performance results do not contradict results from the technical interviews.
 - Present final awards list for Awards Ceremony script to Event Manager
 - Discuss Awards Ceremony presentation procedures with judges and direct them to competition area for presentation of Awards

Judges' Assistant Responsibilities

1. Judges' Assistants keep judges and teams on schedule
 - Sometimes assistants run the timers for the judges
 - Update judges on any schedule changes that occur throughout the day
2. Ensure that teams are ready to enter judging rooms on time, coordinating with the Pit Manager and runners as needed
3. Ensure that teams leave judging rooms on time, and that the Judge Advisor is aware of any judging rooms that are not on schedule
4. Provide the judges with team information sheets
5. Turn in judge score sheets to the scorekeeper for data entry
6. Provide an extra pair of eyes and ears for the judges

6. Understanding FLL Tournaments

FLL Values and Gracious Professionalism

FLL places strong emphasis on teams demonstrating FLL Core Values and Gracious Professionalism. We ask all who participate in FLL to uphold the following values:

- Respect each other in the best spirit of teamwork
- Behave with courtesy and compassion for others at all times
- Honor the spirit of friendly competition
- Act with integrity
- Demonstrate gracious professionalism

- Encourage others to adopt these values

Gracious Professionalism

Dr. Woodie Flowers, National Advisor for *FIRST*, speaks about *gracious professionalism* in this way: “The *FIRST* spirit encourages doing high-quality, well informed work in a manner that leaves everyone feeling valued. Gracious professionalism seems to be a good descriptor for part of the ethos of *FIRST*. It is part of what makes *FIRST* different and wonderful.

Gracious professionalism can and should mean different things to each of us. It is possible however, to outline some of its meanings:

- Gracious attitudes and behaviors are ‘win-win.’
- Gracious folks respect others and let that respect show in their actions.
- Gracious professionals make a valued contribution in a manner pleasing to others and to themselves as they possess special knowledge and are trusted by society to use that knowledge responsibly.

In the long run, gracious professionalism is part of pursuing a meaningful life. One can add to society and enjoy the satisfaction of knowing that you have acted with integrity and sensitivity. That’s good stuff!”

FLL is a child-centered activity and is about giving children a unique and stimulating experience. We want them to learn the value of teamwork and to respect everyone’s ideas and contributions to the team. FLL Values are about appreciating our differences and learning what those differences add to our lives. FLL succeeds most fully when team members bring the FLL Values they learn back to their communities.

At an FLL tournament, all volunteers should be looking for displays of strong FLL Core Values, or evidence that a team is not practicing gracious professionalism. For our top award, the Champion’s Award, this factor is considered in determining the winners.

If a team behaves in a way that violates our Core Values, the team is not eligible to win an award.

Adult Intervention

In FLL, **the children are expected to do the work** – the programming, the research, and the decision-making. Adult coaches and mentors are guides, helping the children find the answers. FLL judges should be wary of teams where adults are overly involved, and ask questions to determine if the children did the work themselves. After questioning the children, if judges believe that adults did the work for the children – or if children tell the judges that their coach or mentor did the work – that team should be marked down to reflect this problem.

But don’t assume that the children couldn’t do a project or certain programming – ask them! Children are usually very honest, and if they can explain why they programmed the robot a certain way, why they chose a certain project topic, or how they arrived at their solution, then the judges will have evidence that the children did the work.

Many tournaments limit the number of adults allowed into judging sessions. Your Judge Advisor can tell you what your tournament’s policy is, and what to expect from adults in terms of involvement during the day.

7. Preparing to Judge

Preparing for Interviews

Review the material related to the FLL Challenge. Judging rubrics are included in this guide for each judged category. These rubrics are given to teams as a roadmap to success, and help identify what skill level teams have achieved. They tell the teams what “Excellent” means, and give judges a common language to use to determine winners.

FLL also provides you with a set of questions to ask during your judging interviews. Review the questions carefully, keeping in mind that you cannot ask all of the questions during a ten-minute interview. Some teams will give you answers that cover multiple questions; others will give brief, targeted answers. Prepare the list of questions that you think will be most useful, and have back-up questions ready if you need them.

You may choose to add your own questions to the list. Just be sure that you and the other judges are using the same information to determine winners in your category.

Most tournaments ask teams to fill out a Team Information page, telling judges about their team and their season. Some ask teams to present these to judges directly, others give the pages to judges with their schedules for the day. This is a helpful way for judges to become acquainted with teams, and can be used to refresh memories during judge deliberation.

Be Fair

Notify your judge advisor about any teams that you know, and any potential conflicts you may have during the judging deliberations process. Judge the teams based upon the information provided to you by the tournament organizer and by FLL. Personal opinions that are not based on these materials and the team's performance should never be part of the judging process.

During the Interviews

Take plenty of notes during judging sessions, and turn in your notes to the Judge Advisor at the end of the day. Please do not take them home, as sometimes, questions about the judging deliberations process come up after the tournament. Be sure to observe teams during setup, breakdown and throughout the day. A team's actions during unguarded moments can tell you volumes, and give you even more information than the interview can.

If score sheets are being used, turn them in regularly. This allows the scorekeeper to enter information on an ongoing basis, and makes the deliberation process easier.

Keep an eye on your schedule. Every time your judging team falls behind a minute or two, the schedules for other judging sessions and robot rounds are affected. Just ten minutes can mean that all judging and robot performance rounds are off schedule, and can cause havoc with the schedule for the entire day.

What to Expect

You will find that some children are talkative, while others are very shy. You may have to ask more questions of a team of introverts to arrive at the same information that a team of extroverts gave you voluntarily. Be prepared to re-word your questions if you find that the children are struggling to understand or answer. Try not to ask questions that allow the teams to answer with a yes or no, and encourage the teams to elaborate on their answers.

Keep in mind that all judging should consider the age of the team members. Age-appropriate expectations are critical to success.

Be polite and respectful, but do not allow the coach to answer questions for the team. Take note when teams look to their coach for answers, and try to determine if the children know the answer and are just nervous, or if they're looking to their coach to find out how to answer.

The children will be nervous. A tournament is a stressful experience. Asking them questions about their robot or their project can help to put them at ease.

Try to ensure that each team leaves your judging room feeling positive about their performance in FLL.

Team Dynamics

Some teams will have clearly defined roles. Two children may program, two others are the robot drivers, and two others directed the project preparation. This is a completely acceptable team dynamic. You may find that not all of the children can answer all of the questions. All of the children should be able to tell you what their role on the team was, and what they did to contribute. If one or two children don't answer any questions, target your questions to those children, and find out what they did during the season.

Don't pre-judge team dynamics, or believe that there is only one right answer. Listen to the children carefully, and expect different levels of appropriate coach involvement based upon the age or maturity of the team members.

Deliberations

The Advisor will lead the judging group in determining the award winners. We recommend that each judge or judging group have at least two to three teams that it can recommend for a specified award. Award distribution is spread as equitably as possible among the teams, with no team winning more than two (2) major awards. A team can only win two awards if one is the Robot Performance Award.

When using multiple judging teams for one award area, each team should have a head judge for their category to facilitate deliberations. For example, if there were 4 pairs of teamwork judges, there would also be a head teamwork judge.

Each pair or team of judges decides its top one or two candidates for an award. Judging scores are only important to the individual judging teams, and are not part of the judging deliberations process. At the judges' meeting, each judging pair or team presents its top choice(s), and shares reasons they are recommending these teams. Good notes from interviews can be very important here. Through consensus, the group then determines the top five or six teams in each award category. If necessary, judges should revisit the top teams, by either informally watching them on the field and in the Pit, or formally back in the judging rooms. This last visit will help determine the final award winners.

For the Champion's Award, all judges will look at the top teams that are the strongest overall in Robot Design, Challenge Project, Teamwork, and Robot Performance Score. Judges will then factor in FLL Values to help determine the award winner.

8. Judging, Deliberating, and Scoring

Judging Process

Before judge deliberation begins, the Head Judge or Judge Advisor should check for conflicts of interest. If a judge has any relationship or alliance with a certain team, he or she should refrain from the judging process and award determination regarding that team.

1. Judge groups meet with FLL Teams
2. Each judging team assesses teams and determines top teams (one or two) that they have seen
3. Each Head Judge hosts a deliberation session to determine top teams for each award for call backs if being used
 - Judges provide reasons why they would like to bring team forward for a call back or consider for an award.
 - Judges receive feedback from Head Referee and Volunteer Coordinator on any teams they are considering to help provide rounded picture of team, as well as highlight any teams that they reviewed that judges may want to consider further.
 - Judges determine if any of the remaining teams should be added to the list and note reasons
 - Head Judge will check in frequently with judges to ensure they are satisfied with the choices.
 - Callbacks, additional review or discussion of top teams occurs
 - After callbacks or additional review by judges, a ranking of the top five or six candidates for each category are determined through the same process.
 - Robot Design Judges review Robot Performance scores before final deliberations. For Robot Dependability Award winners, teams in the top third of Robot Performance scores should be considered for the final award determination. This ensures that robots that perform only one or two missions perfectly are not given top honors, and that the consistently strong robots are the winners.

Final Deliberations and Champion's Award Determination

After the Champion's Award Winner is chosen by process listed below, teams that do not win a Champion's Award are considered for awards under the categories where they were nominated initially.

No team may be awarded more than two awards. The only time that two awards may be given is if one is the Robot Performance Award.

Judges use criteria to determine the winner of the Champion's Award. The team's ranking for Project, Teamwork and Robot Design, in conjunction with the Robot Performance Score and the assessment of FLL Values, are all equally important in determining the award.

All four required competition categories and Core Values are of equal importance in FLL.

1. Head Judge of each award area provides ranking of top teams in their award area, and presents information on why each team was chosen.
2. Judge Advisor identifies which teams appeared as top teams across all awards categories.
3. Judge Advisor runs the voting process.
 - Final deliberations start with the Champion's Award winners, then moves on to other awards categories
 - Top candidates for each award are discussed before voting
 - Each judge votes for as many teams as they like
 - For each team, judges are asked by show of hands if they would be happy if team received first place
 - This process is repeated for each team
 - For each team – the number of votes it receives for first place are recorded
 - The team with the most votes is given first place, team with the next highest votes is given second and if third place is awarded – then team with the third highest amount of votes is given third place.
 - Before final award assignments are made, the Judge Advisor checks with the judges to ensure that judges are comfortable with results
4. Repeat this process for each required award, then continue with optional awards.
5. Once votes are tallied, if a team is listed under several awards – team is given an award based on the highest number of votes it received, with required awards given priority. Example: Team listed in three areas with votes as follows:
 - Team Spirit – second
 - Project Presentation – second
 - Robot Design – first

Team would receive first place for Robot Design and then be removed from other awards and team with next highest amount of votes would be given second place.

If the team ranks first in two categories, as follows:

Team Spirit – first
Project Presentation – first
Robot Design – second

The team will be given the Project Presentation award, because it is the required award. The team with the next highest votes for Team Spirit would receive that award.

If the team ranks first in two required categories, as follows:

Team Spirit – second
Project Presentation – first
Robot Design – first

Project and Robot Design judges should discuss the team's performance in each category, to determine which of the two awards is most appropriate for the team. The team will win the award the judges deem most suitable, and the next ranked team will win the award for the other category.

6. Judge Advisor should check with judges to ensure they are comfortable with the choices.

This judging process is designed to allow for normalization of judging scores. Some judges naturally score higher; others lower. This process allows the judges to consider teams in terms of their overall ranking or achievement, rather than according to their judging scores.

9. Awards Descriptions for Required Awards at Championship and Qualifying Tournaments

Champion's Award (not required at Qualifying Tournaments)

The Champion's Award is the most prestigious award that any team can win. It celebrates the ultimate success of the *FIRST* mission and FLL values. It measures how the team members design, program and score with their robot, the quality of their research and project presentation, their ability to work as a team, solve problems, and demonstrate respect and gracious professionalism. To be considered for the Champion's Award, teams must perform well in both technical and team performance categories, which are equally weighted.

Once teams are selected, judges convene and review the results of the teams' FLL values assessment, as well as their overall impressions of each team's performance and participation at the tournament. Using these additional parameters for determination, judges decide which team receives this highest honor. The team that wins the Champion's Award will not receive any additional awards in the other categories, with the possible exception of the Robot Performance award.

Team Performance Awards

Power Puzzle Project Award (Depending on tournament, may be broken into three distinct awards.)

FLL presents the Project Award to the team whose quality research, innovative solutions, and creative presentation best reflect an in-depth understanding of the various scientific disciplines and issues involved with the Challenge Project.

Tournaments may choose to break the Project Award into three separate awards:

Research Quality

The use and understanding of diverse resources to formulate an in-depth and thorough explanation of the team's point of view and solution to the Challenge Project.

Innovative Solution

Thought-provoking and innovative resolution, including how and why it was chosen.

Creative Presentation

An imaginative, creative presentation demonstrating the team's research and solution.

Teamwork Award

Teamwork is critical to succeed in FIRST LEGO League and is the key ingredient in any team effort. FLL presents this award to the team that best demonstrates extraordinary enthusiasm, an exceptional partnership, and FLL values.

Technical Awards

Robot Design Award (Depending on tournament, may be broken into three distinct awards.)

Judges look for teams whose work stands out for innovation and/or dependability. To assess innovation, the judges watch the robots work and look for things that make them say "Wow!" They interview team members to reveal the less obvious unique and inventive ideas. To assess dependability, the judges interview the teams to learn what solid principles and best practices they used to reduce variability and errors, with preference to robots that best "back it up" throughout the matches.

Innovative Robot Award

This award goes to the team best demonstrating its ability to think "out of the box." Judges consider the most original robot design approach to solving the *Challenge* missions.

Robot Dependability Award

The best designs make products that are consistent over time and dependable under changing conditions. This award goes to the team whose robot most consistently and dependably works every time.

Programming Award

FLL presents this award to the team that understands outstanding programming principles. This team's robot demonstrated programming mastery.

Robot Performance Award

This award goes to the team whose robot achieves the best score on the competition field, or in the elimination round, at the tournament. There are several options judges use to determine the winner:

- If no elimination round is held, the team with the single highest score receives the trophy.
- If elimination rounds are held, the team(s) whose robot achieved the highest score in the elimination round receives the trophy.
- If elimination rounds are held, the highest scoring team (using high score between two teams as the factor for advancement to the next round) receives the award.

If elimination rounds are held, participants are the top teams according to each team's single highest score after three robot performance rounds.

Special Recognition Awards (Not required, but recommended)

Outstanding Volunteer Award

This award honors the dedication of the volunteer(s) whose assistance and devotion helps change the lives of children.

Adult Coach/Mentor Award

Many teams reach significant milestones of success thanks to their close relationship with an adult mentor. This award goes to the coach or mentor whose wisdom, guidance, and devotion are most clearly evident in her team's discussion with the judges.

Young Adult Mentor Award

FLL presents this award to the young adult, high school or college mentor, whose support, impact, inspiration, and guidance are most clearly evident in the team's discussion with the judges.

Optional Awards (At the discretion of the FLL Partner)

Against All Odds Award

This award goes to the team that improvises and overcomes a difficult situation while still making a respectable showing. We can overcome incredible odds if we never give up, no matter what! (Some tournaments prefer to call this award the Persistence Award.)

Team Spirit Award

Some teams really know how to have fun. This award goes to the team that most enthusiastically demonstrates a commitment to getting others to see how accessible, fun, and rewarding science and technology can be, especially when you are part of a great team.

Judges' Award

During the course of competition the judges may encounter a team whose unique efforts, performance, or dynamics merit recognition. Some teams have a story that sets them apart in a unique way. Sometimes a team is so close to winning an award that the judges choose to give special recognition to the team. This award gives the judges the freedom to recognize the most remarkable teams for which a standard award does not exist. Judges should provide details on why they chose to recognize this team to be shared during the awards ceremony.

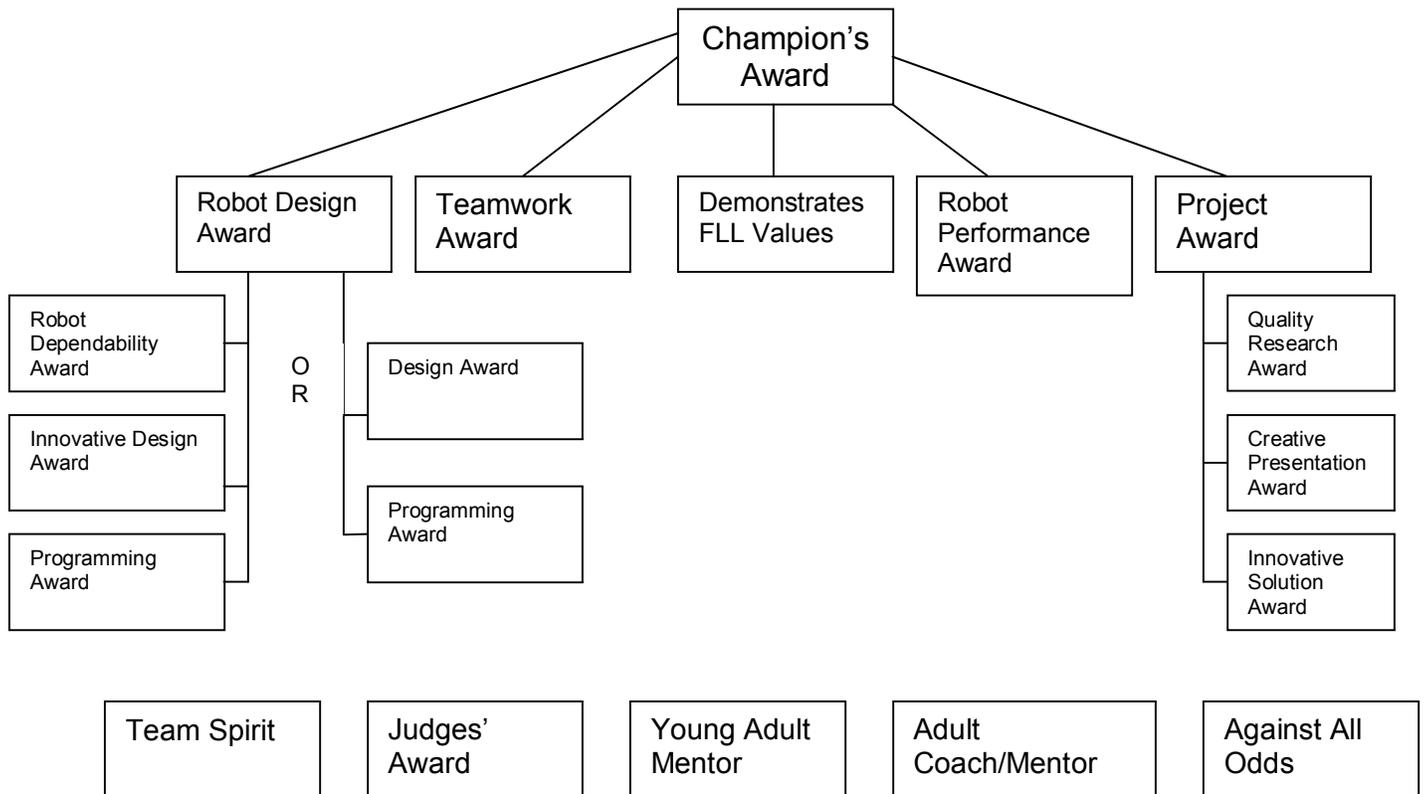
Universal Design Award

This award is given to the team that incorporates Universal Design principles into its project solution to benefit people of all ages and abilities.

Core Principles of Universal Design

For all, regardless of physical or mental limitations, the design is: simple, helpful, flexible, easy to use and understandable, minimizes errors and problems when used incorrectly.

FLL Awards Hierarchy



10. About *FIRST* and *FIRST* LEGO League

About *FIRST*

FIRST (For Inspiration and Recognition of Science and Technology) was founded by inventor Dean Kamen to inspire young people's interest and participation in science and technology. Based in Manchester, N.H., *FIRST* is a 501 (c) (3) not-for-profit public charity.

A volunteer-driven organization, *FIRST* is built on partnerships with individuals as well as businesses, educational institutions, and government. Some of the world's most respected companies provide funding, mentorship time and talent, and equipment to make *FIRST*'s mission a reality. As a team coach, you join over 45,000 committed and effective volunteers who are key to introducing over 130,000 youths to the joy of problem solving through engineering.

FIRST provides two well-known programs, the *FIRST* Robotics Competition (FRC) for high-school-aged young people and *FIRST* LEGO® League (FLL) for 9 to 14 year-olds. *FIRST* also offers the Junior *FIRST* LEGO League (JFLL) for 6 to 9 year-olds and the *FIRST* Vex Challenge (FVC), an intermediate robotics competition that offers students the traditional challenge of a *FIRST* Robotics Competition but with a more accessible and affordable robotics kit. Also located at *FIRST* headquarters is the research and development facility called *FIRST* Place. *FIRST* Place is integral to FLL game design, new program development, evaluation, and professional development of *FIRST* mentors.

Since 1992, the *FIRST* Robotics Competition (FRC) has challenged high school students — working with professional mentors — to solve an engineering design problem in an intense and competitive way. The program is a life-changing, career-molding experience — and a lot of fun. In 2007, the competition reached more than 32,000 students on over 1,300 teams in 37 regional competitions and one Championship event. Our teams come from Brazil, Canada, Israel, Mexico, the Netherlands, the United Kingdom, and every U.S. state.

About *FIRST* LEGO League

In 1998, *FIRST* Founder Dean Kamen and The LEGO Group's Kjeld Kirk Kristiansen joined forces to create *FIRST* LEGO League (FLL), a powerful program that engages younger children in playful and meaningful learning while helping them to discover the fun in science and technology through the *FIRST* experience. As of 2006, children in 44 countries are active in FLL. We are thrilled to have teams in Australia, Austria, Bahrain, Belgium, Brazil, Canada, Chile, China, Denmark, Egypt, Faroe Islands, Finland, France, Germany, Greenland, Hong Kong, Hungary, Iceland, India, Israel, Japan, Jordan, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Nigeria, Norway, Palestine, Peru, Portugal, Saudi Arabia, Singapore, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, United Arab Emirates, the United Kingdom, and the United States.

How FLL Works – A Volunteer Driven Program

FIRST LEGO League relies on volunteers to run the program at many levels, from managing a region to coaching an individual team. We call our volunteers in each region FLL Operational Partners, or FLL Partners. These FLL Partners fundraise, run tournaments, hold workshops and demonstrations, market FLL locally, handle public relations, and recruit volunteers and teams. FLL would not exist without them.

Our FLL Partners agree to maintain certain standards relative to tournaments, the Challenge, and overall program administration. At the same time, the resources of each FLL Partner vary from region to region. Some FLL Partners are affiliated with major corporations that support *FIRST* and FLL. Others are based in a non-profit that has a complementary mission to FLL. And some are individuals with a passion for our cause. For all FLL Partners, their most important goal is to share the FLL program with as many individuals as possible.

11. FLL Challenge Project Judging Materials

PROJECT RUBRIC

	Needs Improvement	Fair	Good	Excellent
Organization, Clarity, and Relevance	<p>No clearly-defined question</p> <p>Presentation rambles</p> <p>Lack of coherent arguments</p> <p>Lack of goal</p>	<p>Research question is vague</p> <p>Organization elements are present, but weak logical flow</p> <p>Arguments are not clear</p> <p>Goal is not clear</p>	<p>Research question is fairly clear and concise, but could use a little tweaking</p> <p>Presentation outline is clearly evident</p> <p>Main point is clear</p> <p>Goals are articulated</p>	<p>Question is stated directly and clearly explained</p> <p>Organized- clear beginning, middle and end with logical thought progression and elements are relevant and well-integrated</p> <p>Persuasive arguments and examples</p> <p>Goal is clear and well integrated</p>
Completeness, Teamwork	<p>Team member ideas not integrated</p> <p>One team member doing all the work</p> <p>Excessive adult intervention (help from mentor/coach) and/or unable to answer judges' questions</p> <p>No supporting data</p> <p>Elements of assignment missing</p> <p>Did not reach out to science professionals or share ideas with others</p> <p>No clear arguments</p>	<p>Team member ideas not well-integrated</p> <p>Less than ½ team doing work</p> <p>Adult intervention is apparent and/or ½ team able to answer judges' questions</p> <p>Insufficient and/or misinterpreted data</p> <p>Most aspects of assignment carried out</p> <p>Attempted to reach out to science professionals</p> <p>Arguments obscured by jargon</p>	<p>Group effort is seamless</p> <p>¾ team doing the work</p> <p>¾ able to answer judges' questions</p> <p>Evidence is presented</p> <p>All aspects of assignment fully carried out</p> <p>Spoke to science professionals or shared ideas with others</p> <p>Good use of technical terms</p>	<p>Collaboration of group effort is seamless</p> <p>All team members participating</p> <p>This project is clearly the work of the children and all students able to answer judges' questions</p> <p>Evidence is clearly supported</p> <p>Original supporting data carefully documented in all aspects of assignment</p> <p>Spoke to science professionals and shared ideas with others</p> <p>Team provides judges with a full understanding of technical terms</p>
Background, Data & Materials	<p>No outside sources (books, websites, magazines, etc) used</p> <p>No mention of sources</p> <p>No visual aids</p> <p>Supported printed materials not provided</p>	<p>Very limited outside sources—only one source or type of source cited</p> <p>Credit to sources not given</p> <p>Ineffective use of visual aids</p> <p>Supporting printed materials provided to judge(s)</p>	<p>Several good sources</p> <p>Credit is given to others when due</p> <p>Visual aids support research question</p> <p>Supporting printed materials provided to judge(s) and referenced</p>	<p>Wide variety of sources cited</p> <p>Credit given clearly when due</p> <p>Carefully chosen visual aids clearly support research question</p> <p>Relevant supporting printed material given to judge(s) and incorporated during presentation</p>

PROJECT RUBRIC (cont.)

	Needs Improvement	Fair	Good	Excellent
Analysis & Conclusions	Presentation has no link to research question	Link to research question is vague	Link to research question is clear	Presentation thoroughly links to research question
	No relevance to FLL theme	Relevance is unclear	Relevance to FLL theme is implied	Relevance to FLL theme is clearly stated
	Alternate views ignored	Alternate views dismissed	Awareness of differing views and implications considered	Alternative views considered with well-supported position on issues
	Lacking personal reflection	Conclusions are vague and unsupported	Conclusions are inferred	Conclusions are clearly supported by data
	Analysis not relatable to research question	Analysis has little relation to research question	Analysis ties to research question	Analysis clearly relates well to research question
	Lacks stance on findings	Insights and findings not shared	Students take firm, articulate stand	Original, important insights are shared
	Many errors	Few errors	Very few evident errors	Presentation is seamless
Style	Too long/short	Slightly too long/short	Proper length	Team prepared and on-time
	Not rehearsed	Semi-rehearsed	Well-rehearsed	Very well rehearsed—Model of clarity & good speaking
	Plagued with technical difficulties	Several technical difficulties	Very minor tech difficulties	No technical difficulties
	No thought put into presentation format	Presentation seems rushed or unrefined	Well-edited	Very well polished and easy to follow
	Lacks excitement	Information presented with limited flair	Students are having fun with delivery	A joy for the audience—humor, personal touches, and clever presentation style

Teams considered for an award must have all three boxes checked.

Completed Project

1. Identified a problem

2. Provided a solution

3. Shared their project with others

Project Presentation Questions
Ask:
Research Quality
What resources did you use to research your problem and why did you choose these?
Did you use any unusual methods to research your topic? If so what and why?
Did the information you used offer different ideas than what you expected to find? If so, what and how did your team use this information?
Did you speak to anyone who works with nanotechnology? What did you learn from them?
Innovative Solution
What makes your solution different from what is being used to solve this problem now, and why do you think it is better?
How did you arrive at your solution and why?
Were there solutions that you thought of that you decided not to use? Why?
Creative Presentation
One aspect of the project asked you to share your ideas with others. How did your team do this?
Can you tell us about a problem or learned something that surprised you while completing this project?
After working on this project, what is the most important thing that your team learned?
How did you decide on this presentation style that you used and why?
What do you think was the most creative aspect of your presentation or project and why?
Look for:
Documentation of resources used
More information provided than other teams gave
All students participated in the research process
Supporting printed materials provided to judges
The entire team participates in discussion
How the team interacts with each other
Do they all talk, or only a few? If so, why?
Does the team look to the coach often or are they focused on the presentation and judges?

Universal Design Award (Optional Award – not given at all tournaments)

FIRST has an optional award to be given out at Championship Tournaments called the Universal Design Award. This award is not part of the criteria used to select the Champion's Award Winners, nor part of the Innovative Project Solution Award. This award is presented to the team(s) who incorporated principles of Universal Design into its Challenge Project solution and related presentation, to benefit people of all ages and abilities. Core principles of universal design state that "products and environments... be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. (Ron Mace North Carolina State University, the Center for Universal Design)

Award Evolution:

FIRST is working with a group called Freedom Machines, who produced a film about assistive technology for individuals with physical limitations.

A key element of this type of technology is Universal Design – the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. (Ron Mace North Carolina State University, the Center for Universal Design)

There are 7 core principles of Universal Design:

Equitable Use – design is useful and marketable to all people with diverse abilities

Flexibility in Use – design accommodates a wide range of preferences and abilities

Simple and Intuitive – design is easy to understand regardless of user's abilities

Perceptible Information – user understands how to use design regardless of user's abilities

Tolerance for Error – design allows for errors - accidental or unintended actions - made by user

Low Physical Effort – design easy to use without exhausting user

Size and Space for Approach and Use – design size and space allows for use regardless of user's physical limitations

Short videos and tutorials, including examples of Universal Design as it applies to Power Puzzle, are available on the web at <http://www.freedommachines.com/FLLUD.htm>.

Three Examples of Universal Design Applied to the 2005 Challenge – Ocean Odyssey

Scuba Equipment and Mini-Subs

Background: The development of scuba equipment and mini-sub makes it possible for people to stay underwater to study or appreciate underwater environments, and traverse distances not possible by muscle power alone.

Universal Design: A team designs or modifies new and existing scuba equipment, including a mini-sub, so that people of all ages and abilities can explore the wonders of the ocean.

References: Handicapped Scuba Association (HAS International): <http://www.hsascuba.com/>.

Deep-Water Robots

Background: Deep-water robots make it possible to explore depths of the ocean from controls above water. Sonar makes it possible to hear the placement and characteristics of objects in areas where vision is low.

Universal Design: A team designs a deep-water robot that can be controlled from the surface using senses other than sight and manipulated by people with a wide range of physical and sensory abilities.

References: The US Navy develops real-time three-dimensional virtual environments using sonar:

<http://web.nps.navy.mil/~brutzman/vrtp/rra/rra.html>. Stanford Develops MARVE: the next generation (virtual reality deep sea robot and environment) : <http://ldt.stanford.edu/~lmalcolm/marvesite/redesign/nextgen.htm>.

Underwater Habitats

Background: Underwater habitats have been in use for several decades enabling people to stay submerged for extended periods of time for scientific, commercial and recreational activities. It is even possible to rent underwater hotel lodging.

Universal Design: A team designs an underwater habitat that includes components for exploration and recreation suitable for a family of five with a wide range of ages and abilities (1 elderly grandparent, 2 parents and 2 young children).

References: Marine Resources Development Foundation (underwater habitats): <http://www.mrdf.org/uwhabitats.html>.

Jules' Undersea Lodge: <http://www.jul.com/>.

Project Score Sheets

Combined Score Sheet for Project

Project Presentation	Needs Improvement	Fair	Good	Excellent	
	Rate each skill by placing a check mark next to appropriate level.				
Team Number					
Team Name					
Question, Language Use					
Completeness, Teamwork					
Background, Data & Graphics					
Analysis & Conclusions					
Style					
Team Total					
Multiplier	X1	X2	X3	X4	Sum/5
Final Score					
Comments					

Team Name _____ Team Number _____

Project Presentation

Strengths:

Question, Language Use Completeness, Teamwork Background, Data & Graphics Analysis & Conclusions
 Style

Comments: _____

Needs Improvement:

Question, Language Use Completeness, Teamwork Background, Data & Graphics Analysis & Conclusions
 Style

Comments: _____

Project Score Sheet for Split Awards

	Needs				
Research Quality	Improvement	Fair	Good	Excellent	
	Rate each skill by placing a check mark next to appropriate level.				
Team Number					
Team Name					
Problem Definition					
Data and Supporting Materials					
Resources Utilized					
Visual Aid Support					
Overall Design					
Multiplier	x1	x2	X3	X4	sum/5
Final Score					
Comments					

Team Name _____

Team Number _____

Research Quality

Circle Choice

Strengths:

Problem Definition

Data and Supporting Materials

Resources Utilized

Visual Aid Support

Overall Design

Needs Improvement:

Problem Definition

Data and Supporting Materials

Resources Utilized

Visual Aid Support

Overall Design

Comments: _____

Innovative Solution	Needs				
	Improvement	Fair	Good	Excellent	
	Rate each skill by placing a check mark next to appropriate level.				
Team Number					
Team Name					
Analysis of Data and Supporting Materials					
Solution Defined and Supported by Data					
Original/Important Insights of Solution					
Impact of Solution					
Universal Design Elements					
Multiplier	x1	x2	x3	x4	sum/5
Final Score					
Comments					

Team Name _____ Team Number _____

Innovative Solution

Circle Choice

Strengths:

Analysis of Data Elements Solution Defined/Supported Original Insights of Solution Impact of Solution Universal Design

Needs Improvement:

Analysis of Data Elements Solution Defined/Supported Original Insights of Solution Impact of Solution Universal Design

Comments: _____

Creative Presentation	Needs Improvement	Fair	Good	Excellent	
	Rate each skill by placing a check mark next to appropriate level.				
Team Number					
Team Name					
Shared Information With Others					
Unique/Different Presentation Style					
Incorporated Problem, Research and Solution into Effective Presentation					
Overall Impact of Presentation					
Multiplier	X1	x2	x3	x4	sum/4
Final Score					
Comments					

Team Name _____ Team Number _____

Creative Presentation

Strengths:

Shared Information w/ Others

Unique Presentation Style

Incorporated Problem, Research & Solution into Presentation

Overall Impact of Presentation

Comment: _____

Needs Improvement:

Shared Information w/ Others

Unique Presentation Style

Incorporated Problem, Research & Solution into Presentation

Overall Impact of Presentation

Comment: _____

12. Teamwork and FLL Values Judging Materials

TEAMWORK and FLL VALUES RUBRIC

	Needs Improvement	Fair	Good	Excellent
Roles & Responsibilities	<p>No clearly-defined roles</p> <p>Not clear who completed which tasks and/or very uneven distribution of work</p> <p>Team members not collaborative</p> <p>Time management is poor or purely directed by the coach</p>	<p>Loose role assignments</p> <p>Uneven work distribution</p> <p>Team members will help each other, if asked</p> <p>Time management skills are weak</p>	<p>Defined roles</p> <p>Work is distributed fairly- but with individual focus only</p> <p>Team members assist each other without being asked</p> <p>Team mentions learning time management</p>	<p>Clearly defined roles</p> <p>Workload is distributed fairly and team members understand each other's roles</p> <p>Team members fill each other's roles (happily!), if needed</p> <p>Team members give concrete examples of learning time management</p>
Gracious Professionalism	<p>Team members show little/no respect for each other</p> <p>Team members show no awareness of school/community issues</p> <p>Team members compete with each other to be heard during judging</p> <p>Team doesn't understand the concept of gracious professionalism</p>	<p>Team members show limited respect for each other</p> <p>Team members show limited awareness of school / community issues</p> <p>Team is aware of gracious professionalism, but gives no concrete examples of what they have done to help others</p> <p>Team did not help each other/other teams</p>	<p>Team members show respect for teammates</p> <p>Team members imply increased awareness of school and/or community</p> <p>Team members are vague about how this awareness translates into other aspects of their lives</p> <p>Team implies that they have helped each other/other teams</p>	<p>Team members give concrete examples of respect for teammates</p> <p>Team members show increased awareness of their school/community including concrete examples</p> <p>Team members clearly discuss how this increased awareness translates into other areas of their lives</p> <p>Team members give concrete examples of how they have helped each other/others</p>
Problem-Solving & Team Dynamics	<p>A problem was identified, but no steps were taken to identify a solution</p> <p>One team member used power to reach their desired outcome</p> <p>One person's ideas are used</p> <p>Team members working against each other</p> <p>Coercion and/or confrontation dominate</p>	<p>A problem was identified, but the chosen solution was inadequate to some team members</p> <p>Some team members didn't accept the solution</p> <p>Simple majority had input at meetings</p> <p>Decisions made by simple majority without collaborative discussion</p> <p>Team coexists peacefully</p>	<p>A problem was identified and there is compromise evident in the solution</p> <p>Team tested various solutions to solve the problem</p> <p>Cooperation is a dominant theme</p> <p>Decisions made by most of the team, however team focuses on individual tasks</p> <p>Team collaborates well</p>	<p>A problem was identified and the team worked together to find a solution</p> <p>Various solutions were tested and then incorporated</p> <p>Team accepts input from all and sees the big picture in their overall goals</p> <p>Team members show equality and value each other's roles by entire team making decisions</p> <p>Collaboration and co-ownership are dominant themes with the members recognizing interdependence</p>

TEAMWORK and FLL VALUES RUBRIC (cont.)

	Needs Improvement	Fair	Good	Excellent
Confidence & Enthusiasm	Only one team member spoke to the judge(s)	About ½ the team spoke to the judge(s)	Everyone was ready to answer at least one question from the judge(s)	All team members speak to the judges showing confidence in themselves as well as the team
	Some team members seem disinterested	About ½ the team seems interested	Most of the team appears excited and interested	Team members show equal investment in FLL
	Most team members are disengaged	Members are not paying attention to one another	Members are enthusiastic, but talk over one another	Members enthusiastically work together to include each other
FLL Values	No clear enthusiasm for science, engineering or technology	Some members show an interest in science, engineering or technology	Team shows a keen interest in subject matter, but limited use of concrete examples	Group articulates a clear understanding of the FLL experience
	Team doesn't mention new skills acquired	Limited attention paid to new skills acquired	Team implies new skills acquired	Team gives concrete examples of new skills acquired and their interest in the subject areas

Teamwork and FLL Values Questions
Ask:
Roles and Responsibilities
Tell me about the roles each of you had on the team and how this worked?
Gracious Professionalism
What does Gracious Professionalism mean to you?
Can you give an example of gracious professionalism your team experienced?
Problem Solving and Team Dynamics and Communications
Tell us about a problem your team had and how it was solved.
FLL Values
Tell us what you have learned about FLL and how you think it will help you in the future?
If you saw something happening to another team and thought it wasn't fair, what would you do and why?
Look for:
Confidence and enthusiasm of team members
Are team members listening to each other and to the judges?
Are team members looking at the judges when they speak or at team members when they are talking?
Are they interrupting each other or waiting their turn?
Is everyone answering questions or just a few?
Do they give descriptions and examples or one word answers?
Do they encourage each other to participate?

FLL Core Values

FLL Core Values appear in the *FLL Coaches' Handbook*. Teamwork judges may find this helpful, as they prepare to interview teams about their FLL experience.

We are a team.

We do the work to find the solutions with guidance from our coaches and mentors.

We honor the spirit of friendly competition.

What we discover is more important than what we win.

We share our experiences with others.

We display gracious professionalism in everything we do.

We have fun.



Teamwork Score Sheet

Teamwork and FLL Values	Needs				sum/5
	Improvement	Fair	Good	Excellent	
Rate each skill by placing a check mark next to appropriate level.					
Team Number					
Team Name					
Roles and Responsibilities-					
Gracious Professionalism					
Problem Solving & Team Dynamics & Communications					
Confidence & Enthusiasm					
FLL Values					
Team Total					
Multiplier	X1	X2	X3	X4	
Final Score					
Comments					

Team Name _____ Team Number _____

Teamwork
Circle Choice
Strengths:

Roles & Responsibilities Gracious Professionalism Problem Solving/Dynamics/Communication Confidence/Enthusiasm FLL Values

Needs Improvement:
Circle Choice

Roles & Responsibilities Gracious Professionalism Problem Solving/Dynamics/Communication Confidence/Enthusiasm FLL Values

Comments: _____

13. Robot Design Judging Materials

ROBOT DESIGN RUBRIC

	Needs Improvement	Fair	Good	Excellent
Innovative Design	Design, drive train, and structure are standard. Manipulators/sensors used in expected ways, if used. Strategy for combining missions expected. Programming written as expected.	Design creative, unique use of drive train or structure. Manipulators/sensors used in unexpected ways, if used. Unique/creative strategy for coordinating missions. Programming tasks used in unexpected ways. (For this category, 1 of the 4 above is demonstrated.)	Design creative, unique use of drive train or structure. Manipulators/sensors used in unexpected ways, if used. Unique/creative strategy for coordinating missions. Programming tasks used in unexpected ways. (For this category, 2 of the 4 above are demonstrated.)	Design creative, unique use of drive train or structure. Manipulators/sensors used in unexpected ways, if used. Unique/creative strategy for coordinating missions. Programming tasks used in unexpected ways. (For this category, 1 done exceptionally or 3 of 4 above demonstrated.)
Strategy, Process, Problem Solving	Uses standard design. No design process (from initial concept through build, test, refinement) communicated. Strategy based only on ease of task - did not maximize time, combine mission tasks or consider points.	Some forethought in initial design. Refinement of robot and programs not communicated. Strategy often based on ease of task - few risks taken. Some consideration of time, mission combinations or maximizing points.	Basic understanding of design process, evidence of conceptual planning, building, testing, refining of robot, manipulators, programs. Effective strategic planning, combining mission tasks, plotting routes, using manipulators and/or program slots.	Communicates complete design process, from initial concept through build, test, and refinement. Excellent/innovative strategy, combining mission tasks, plotting routes, maximizing points.
Locomotion and Navigation	Difficulty going same distance on repeated missions. Too fast for accuracy, or too slow to accomplish mission. Turns inaccurate or inconsistent. Moves between two points inconsistently. No effort to know position on table beyond distance and accurate turns.	Goes defined distances sometimes. Turns sometimes accurate. Sometimes moves between two points consistently. Little or no effort to know position on table beyond distance and accurate turns.	Goes defined distances most of time. Not too fast for accuracy or too slow to accomplish mission. Turns reasonably accurate and consistent. Allows for variables. Moves between two points with reasonable accuracy and consistency. May use various sensors.	Goes defined distances efficiently. Adjusts speed, position sensing for optimum speed and accuracy. Turns accurately and consistently. Allows for variables (battery wear, obstacles). Moves between two points with very good accuracy and consistency. May use various sensors.
Programming	Programs disorganized Programs inefficient Results unpredictable Sensors inadequately used Programs do not accomplish expected tasks Variables, loops, subroutines and conditions defined but unused Children can't describe what run will do.	Programs somewhat organized Programs efficient at completing some tasks Results somewhat unpredictable Programs do some of what is expected Variables, loops, subroutines and conditions, if used, not understood.	Programs organized Programs efficient at completing most tasks Programs do what they're expected to do Sensors used effectively, if used Variables, loops, subroutines and conditions, if used, are needed Children can describe most of mission.	Programs logically organized Programs very efficient Programs always work, even for complex tasks Sensors, if used, guarantee certain actions in every trial Programs work in competition as in practice Variables, loops, subroutines and conditions, if used, are effective Children can describe mission and reference the program.

ROBOT DESIGN RUBRIC (cont.)

	Needs Improvement	Fair	Good	Excellent
Children Did the Work	Little knowledge of why some parts are located as they are on the robot. Little or no understanding of what pieces did. Building/programming appears primarily done by coach.	Knowledge of robot structure and programming shows minimal understanding of underlying design, science, and technology (age specific expectations). Building and programming seems primarily directed by coach.	Knowledge of robot structure and programming shows moderate understanding of underlying design, science, and technology (age specific expectations). Building/programming mostly directed by team members, with help from coach.	Knowledge of robot structure and programming shows thorough understanding of underlying design, science, and technology (age specific expectations). Building/programming was done by team members.
	<i>Okay for team members to have different roles, as long as work is done by children.</i>			
Structural	Difficulty with robot assembly during demo. Base weak, falls apart when handled or run. Attachments, if used, weak and fall apart often; difficulty completing task; or overly complex. Robot design from book, little modification by team.	Robot assembly done with few errors. Robot base structure has some stability Attachments, if used, difficult to apply; and/or not modular; not precise or not repeatable. Robot shows signs of team's design ideas.	Slow robot assembly, with no errors. Robot base stable, but not robust. Attachments, if used, modular; function most of the time; and/or take some time to assemble; somewhat precise and/or repeatable. Robot designed by team	Robot assembles easily. Robot base stable and robust. Attachments, if used, modular, function as expected and easily added/removed from robot. Robot displays wide range of capabilities. Attachments, if used, perform tasks extremely well and are repeatable. Robot designed by team; design is unique and creative.
	Overall Design	Robot lacks most critical design components: works, stays together, efficient parts use, attachments easy to add/remove, simpler than comparable robots. Few components work together; few components look like they belong together.	Robot lacks many critical design components: works, stays together, efficient parts use, attachments easy to add/remove, simpler than comparable robots. Some components work together; some components look like they belong together.	Robot lacks some critical design components: works, stays together, efficient parts use, attachments easy to add/remove, simpler than comparable robots. Most components work together; most components look like they belong together.

Robot Design & Programming Questions
Strategy, Process, Problem-Solving Questions
What was the greatest design or programming difficulty you encountered? How did you solve that problem?
Innovative Design Question
What part of your design, program or strategy do you think is unique to your team? How did you come up with the idea?
Locomotion & Navigation Questions
Would you explain how your robot turns (or travels a specific distance, or goes from base to a specific destination)? How satisfied are you with this?
Would you explain which sensors were used? Why? How? (If no sensors were used) Would you explain how your robot knows where it is on the field? Note: Sensing includes not only touch and rotation sensors, but time (timers in the RCX) and passive sensing such as referencing to walls or other objects, etc.
Children Did the Work Question
How did your coach help the team be successful?
Programming Question
What mission is your favorite? Explain the steps in the program for that mission.
Structural Questions
How did you get your robot to stay together?
If your robot has attachments, tell us about them. Which attachments are most difficult to put on and/or take off?
Overall Design Questions
How many of the missions has THIS robot completed successfully in a single match (includes a tournament match, a tournament practice, or home practice)?
We want to consider the overall design of your robot. Tell us about your robot, its attachments and sensors and the missions the robot attempts so that we will understand why your robot has a good overall design.
Additional Questions
Show me the run that uses this part.
What jobs/roles did each child have on the team?
What program are you particularly proud of? Why?
Show me the program for your favorite run.
Look For:
Unusual strategy, programming or design.
Propulsion or steering methods or functional aspects that no one else has or you are surprised someone would try.
Robot is able to effectively perform the same task over and over .
Parts or functional aspects that make something difficult look very easy.
Parts or mechanisms that perform several functions.
Propulsion or steering methods or functional aspects that work and you have no idea how.
Children can describe what the robot will do based on the program.
Does the team look to the coach for answers or are they focused on the robot and judges?

Robot Design Score Sheet – Combined Award

		Needs				
Robot Design		Improvement	Fair	Good	Excellent	
		Rate each skill by placing a check mark next to appropriate level.				
Team Number						
Team Name						
Robot Design						
Innovative Design						
Strategy, Process & Problem-Solving						
Locomotion & Navigation						
Programming						
Children Did the Work						
Structural						
Overall Design						
Team Total						
Multiplier		X1	X2	X3	X4	sum/7
Final Score						
Comments						

Team Name _____

Team Number _____

Robot Design
Circle Choice

Strengths:

Innovative Strategy, Process Locomotion/Navigation Programming
Children' Work Structural Overall Design

Needs Improvement:
Circle Choice

Innovative Strategy, Process Locomotion/Navigation Programming
Children' Work Structural Overall Design

Robot Design Award – Split Awards for Dependability, Innovation, Programming

Robot Dependability					
Team Number					
Team Name					
	Rate each skill by placing a check mark next to appropriate level.				
	Needs Improvement	Fair	Good	Excellent	Total
Strategy, Process & Problem-Solving					
Locomotion & Navigation					
Children Did the Work					
Structural					
Overall Design					
Team Total					
Multiplier	X1	X2	X3	X4	sum/5
Final Score					
Comments					

Robot Performance scores should be reviewed before final deliberations. Robot Dependability Award winners should be chosen from among the top third by score.

Programming						
Team Number						
Team Name						
	Rate each skill by placing a check mark next to appropriate level.					Check if feature used
	Needs Improvement	Fair	Good	Excellent	Total	
Organization						√
Efficiency						√
Predictable Results						√
Children Did the Work						√
Sensors, if Used, Effectiveness						
Variables/Subroutines, if Used, Effectiveness						
Team Total						
Multiplier	X1	X2	X3	X4	Sum / Features	
Final Score						
Comments						

Team Name _____ Team Number _____

Programming

Strengths:

Organization Efficiency Predictable Results Variables/Subroutines Effective
 Sensors Effective Children' Work

Comments:

Needs Improvement:

Organization Efficiency Predictable Results Variables/Subroutines Effective
 Sensors Effective Children' Work

Innovative Robot Design						
Team Number						
Team Name						
	Rate each skill by placing a check mark next to appropriate level.					
	Needs Improvement	Fair	Good	Excellent		Total
Innovative Structure/Drive Train						
Unique/Creative Strategy						
Innovative Manipulators/Sensors						
Programming Used in Unexpected Ways						
Children Did the Work						
Overall Innovative Design						
Team Total						
Multiplier	X1	X2	X3	X4	sum/5	sum/6
Final Score						
Comments						

14. Adult/Young Adult Mentor Judging Materials

Mentor Score Sheet

Adult/Young Adult Mentor Award	Needs Improvement	Fair	Good	Excellent		
	Rate each skill. Place a check mark next to appropriate level.					
Team Number		Team Name				
Team's Relationship with Coach						
Team talks about relationship with coach citing examples of how they were affected and what they did as a result						
Team talks about what they learned from coach citing examples, how they were affected and what they did as a result						
Team's Independence						
Team describes and gives examples of how they work independently of coach and only uses coach as guide						
Team learned new skills from coach and can describe how they applied them to other areas.						
Team Structure						
Team structure is defined, explained how it works, and why team chose to work this way and what influence coach had on this structure						
All team members have been exposed to all elements of FLL Program and have shared roles and responsibilities, understand role coach played in this structure						
Team Total Score						
Multiplier	X1	X2	X3	X4	Sum/6	
Final Score						
Comments						

Adult/Young Adult Mentor Award Questions
Ask:
Team's Relationship with Coach
What have you learned from your coach and why do you feel this is important?
Has what you learned from your coach helped you in other ways such as at home or at school?
Team's Independence - Able to work on their own
Tell us how you work together as a team with your coach.
Team Structure
What roles do each of you have and how did you and your coach decide this?
If someone was out for a week, what would your team do?
Look For
How does the team express feelings about mentor?
What do their faces tell you as they describe their mentor?
Is everyone participating in the discussion, or just a few?
Are the children looking at the mentor as they talk?
How is the mentor reacting to the children from the time they enter the room until they leave?

16. Award Candidates Matrix Sheet

Champion' s Award Candidates (top 6)								
1.		2.		3.				
4.		5.		6.				
Project Award Candidates (top 6)			Robot Design Candidates (top 6)			Teamwork Candidates (top 6)		
Creative Presentation	Innovative Solution	Quality Research	Innovative Robot	Robot Dependability	Programming			
1						Robot Performance (top 6)		
2								
3								
4								
5								
6								
FLL Values	Against All Odds	Judges' Award	Universal Design Award					
1								
2								
3								
4								
5								
6								

18. Team Comment Form

All decisions by referees and judges are final.

This form provides space for teams to inform the Head Referee or Judge Advisor of any questions or comments that a team may have during the tournament. The coach or mentor must fill out this form and provide the information in writing. Forms will be read, but there is no guarantee that a response will be provided to the coach.

Please maintain Gracious Professionalism at all times.

Team # _____

Team Name: _____

Name of Coach:

Comment Section:

19. Judging Materials

Prepare the following materials for each Judge Advisor, Head Judge, and Judge to use on tournament day.

Judge Advisor

Judges' Guide
Awards Ceremony Script
List of judges and judge assistants
Map of tournament and judging rooms
Master schedule
Judging schedules
Program, if there is one
Clipboard
White board or flip charts and easels with markers
Large table for Judge Advisor
Large table for judging materials
Seating for final deliberations – judging room can be used
Calculators – if using scores to assist in ranking teams
Computer – if using score-based normalization
Trash can
Post-its
Tape
Copies of all judging forms
Call-back judging forms for all judges
Pens, pencils, erasers, highlighters
Complete set of judging rubrics
Copies of judging forms for each category
Awards descriptions
Please note: quality assurance should be done for technical judging FLL robot game tables and field setup kits prior to the day of the tournament

Head Judge for each category – Teamwork, Technical and Project

Judges' Guide
List of judges and judge assistants
Map of tournament and judging rooms
Master schedule
Judging schedules
Program, if there is one
Clipboard
Flip chart and easel with markers, white board or blackboard
Seating for category deliberations – judging room can be used
Trash can
Tape
Copies of judging forms for their category
Pens, pencils, highlighters
Judging rubric for the category
Awards descriptions
Clock or watch

Teamwork Judges – each judge should have

Map of tournament and judging rooms
Master schedule
Teamwork judging schedule
Program, if there is one
Clipboard
Team Information Page for each team he will see
Judging forms and score sheets for each team he will see
FLL Core Values statement
Teamwork awards description
Judging rubric
Pen or pencil
Clock or timer

Technical Judges – each judge should have

Map of tournament and judging rooms
Master schedule
Technical judging schedule
Program, if there is one
Clipboard
Team Information Page for each team she will see
Judging forms and score sheets for each team she will see
Challenge missions, rules and Q & A
Technical awards description
Judging rubric
Pen or pencil
Each judging room should have one FLL field setup kit, with table surface and borders, for teams to demonstrate their robot runs
Clock or timer

Project Judges – each judge should have

Map of tournament and judging rooms
Master schedule
Project judging schedule
Program, if there is one
Clipboard
Team Information Page for each team he will see
Judging forms and score sheets for each team he will see
Project assignment for the Challenge
Technical awards description
Judging rubric
Pen or pencil
Details on timing of sessions, instructions on what resources teams are allowed to use – i.e., power, multimedia projector and screen, etc.
Clock or timer
Signs saying “two-minute warning” to alert teams to timing of their presentation