ROBOT DESIGN RUBRIC

	Needs Improvement	Fair	Good	Excellent
Innovative Design	• Design, drive train, and structure are standard • Manipulators/sensors used in expected ways • Strategy for combining missions expected • Programming written as expected	• Design creative, unique use of drive train or structure • Manipulators/sensors used in unexpected ways • Unique/creative strategy for coordinating missions • Programming tasks used in unexpected ways *(Fair: 1 of the 4 above is demonstrated.)*	• Design creative, unique use of drive train or structure • Manipulators/sensors used in unexpected ways • Unique/creative strategy for coordinating missions • Programming tasks used in unexpected ways *(Good: 2 of the 4 above are demonstrated.)*	• Design creative, unique use of drive train or structure • Manipulators/sensors used in unexpected ways • Unique/creative strategy for coordinating missions • Programming tasks used in unexpected ways *(Excellent: 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, and refinement) communicated	Some forethought in initial design. Refinement of robot and programs not communicated	Basic design process communicated, evidence of conceptual planning, building, testing, refining of robot, manipulators, programs	Complete design process communicated, from initial concept through build, test, and refinement
	Strategy based only on ease of task - did not maximize time, combine mission tasks or consider points	Strategy often based on ease of task - few risks taken. Some consideration of time, mission combinations or maximizing points	Effective strategic planning, combining mission tasks, plotting routes, using manipulators and/or program slots	Excellent/innovative strategy, combining mission tasks, plotting routes, maximizing points
Locomotion & Navigation	Difficulty going same distance on repeated missions	Goes defined distances sometime	Goes defined distances most of time	Goes defined distances efficiently
	Too fast for accuracy, or too slow to accomplish mission	Somewhat too fast for accuracy or somewhat too slow to accomplish mission	Not too fast for accuracy or too slow to accomplish mission	Adjusts speed, position sensing for optimum speed and accuracy
	Turns inaccurate or inconsistent	Turns sometimes accurate	Turns reasonably accurate and consistent	Turns always accurate and consistent
	Moves between two points inconsistently	Sometimes moves between two points consistently	Moves between two points with reasonable accuracy and consistency	Moves between two points with very good accuracy and consistency
	No effort to know position on table beyond distance and accurate turns	Little or no effort to know position on table beyond distance and accurate turns	Allows for variables. May use various sensors to know position	Excellent allowance for variables (battery wear, obstacles). May use various sensors to know position
Programming	Programs disorganized	Programs somewhat organized	Programs organized	Programs logically organized
	Programs inefficient	Programs efficient at completing some tasks	Programs efficient at completing most tasks	Programs very efficient
	Results unpredictable	Results somewhat unpredictable	Programs mostly predictable	Programs always work, even for complex tasks

Programming, cont.	*Sensors to replicate actions (if used):*		**Not Used**	**Used**
	Sensors inadequately used	Sensors occasionally used effectively	Sensors used effectively	Sensors guarantee certain actions in every trial
	Programs do not accomplish expected tasks	Programs do some of what is expected	Programs do what they're expected to do	Programs work in competition as in practice
	Variables, loops, subroutines and conditions (if used):		**Not Used**	**Used**
	Variables, loops, subroutines and conditions defined but unused	Variables, loops, subroutines and conditions not understood	Variables, loops, subroutines and conditions are needed	Variables, loops, subroutines and conditions are effective
	Children can't describe what run will do	Children can describe part of the mission	Children can describe most of mission	Children can describe mission and reference the program
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 do	Knowledge of robot structure and programming shows minimal understanding of underlying design, science, and technology	Knowledge of robot structure and programming shows moderate understanding of underlying design, science, and technology	Knowledge of robot structure and programming shows thorough understanding of underlying design, science, and technology
			Age-specific expectations	
	Building/programming appears primarily done by coach	Building and programming seems primarily directed by coach	Building/programming mostly directed by team members, with help from coach	Building/programming was done by team members
			Okay for team members to have different roles, as long as work is done by children	
Structural	Difficulty with robot assembly during demo	Robot assembly done with few errors	Slow robot assembly, with no errors	Robot assembles easily
	Base weak, falls apart when handled or run	Robot base structure has some stability	Robot base stable, but not robust	Robot base stable and robust
	Attachments (if used):		**Not Used**	**Used**
	Attachments weak and fall apart often; difficulty completing task; or overly complex	Attachments difficult to apply; and/ or not modular; not precise or not repeatable	Attachments modular; function most of the time; and/or take some time to assemble; somewhat precise and/or repeatable	Attachments modular; function as expected and easily added/removed from robot. Robot displays wide range of capabilities. Attachments perform tasks extremely well and are repeatable
	Robot design from book, little modification by team	Robot shows signs of team's design ideas	Robot designed by team	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	Robot lacks many critical design components: works, stays together, efficient parts use, attachments easy to add/remove, simpler than comparable robots	Robot lacks some critical design components: works, stays together, efficient parts use, attachments easy to add/remove, simpler than comparable robots	Robot is elegant, complete system
	Few components work together	Some components work together	Most components work together	All components work well together
	Few components look like they belong together	Some components look like they belong together	Most components look like they belong together	All components look like they belong together

PROJECT RUBRIC

	Needs Improvement	Fair	Good	Excellent
Research	**No clearly defined research problem or it does not relate to the FLL theme	Research problem is vague or relates poorly to FLL theme	Research problem is fairly clear and concise, and relates fairly well with FLL theme	Research problem is explained clearly and concisely, integrates well with FLL theme
	No outside sources used in research	Limited outside sources used in research or few mentioned	Cited a diverse variety of outside sources used in research	Cited multiple sources used in research including communication with a professional(s) (or attempts to)
	No research on the impact of the problem	Limited research on the impact of the problem	Impact of problem clearly researched	Impact of problem thoroughly examined and applied to solution
	No research on existing solutions or technologies used to address the problem	Limited research on existing solutions or technologies used to address the problem	Present solutions and technologies clearly researched but not considered in developing solution	Clearly researched existing solutions and technologies, applied knowledge when developing solution
	Alternative theories or interpretations ignored, no clear arguments	Alternative theories or interpretations dismissed and/or arguments obscured by jargon	Considered alternative theories or interpretations and presented clear arguments	Alternative theories or interpretations presented and addressed in persuasive arguments
	Did not demonstrate understanding of technical terms	Demonstrated a limited understanding of technical terms	Demonstrated understanding of technical terms but didn't explain them clearly	Demonstrated and shared a complete understanding of technical terms
Innovative Solution	**No solution presented	Solution is unclear	Solution is described but not clear how it addresses the problem	Solution is concisely described and clearly addresses the problem
	No data presented in support of proposed solution	Weak or limited data to support proposed solution	Adequate data supports proposed solution	Substantial data supports proposed solution
	Solution is not innovative or new	Solution is somewhat innovative, or limited knowledge of science and/or technology applied	Solution is innovative and applies some knowledge of science and/or technology	Solution is innovative and applies knowledge of science and/or technology

Sharing	**Did not share their project, research or solution with anyone outside team	Shared their project, research or solution with team parents	Shared their project, research or solution with others beyond parents such as a class, sponsors, or other teams	Shared their project, research and solution with others such as their school, community, or experts in their field
	Did not consider how their problem and/or solution might impact themselves or consider what changes to make	Considered how this might impact themselves or their family, but did not consider changes	Considered how this might impact themselves and their family and recommended changes	Considered how this impacts others and implemented a plan to produce change
Creative Presentation	Presentation rambles	Presentation organization is weak	Presentation organization is clear, integration and/or logical progression could be improved	Organized presentation with clear beginning, middle and end; well-integrated; logical progression
	Limited number of team members participated in project presentation	Less than half of the team participated	Most of the team participated in the presentation	All or almost all team members participated
	Unable to answer judges' questions	Weak answers to judges' questions	Adequate answers to judges' questions	Comprehensive answers to judges' questions
	Team member ideas were not integrated	Team member ideas not well-integrated	Project is a group effort	Collaboration of group is seamless
	No visual aids or support material	Ineffective visual aids or weak support material	Visual aids or support material complement presentation	Carefully chosen visual aids and/or support material clearly add to presentation
	Lacks excitement or creativity	Information presented with limited creativity	Team uses creativity doing presentation	Excellent use of creativity
	Excessive adult intervention	Adult intervention is apparent	No apparent adult intervention but difficulty with setup/take down within allotted time	Clearly the work of the children from beginning to end including all visual aids and material
	Many errors or not rehearsed	Few errors or should have rehearsed more	Very few evident errors, well rehearsed	No evident errors and well rehearsed
	Too long	Slightly too long	Proper length	Excellent use of time
	Plagued with technical difficulties	Several technical difficulties	Very minor technical difficulties	No technical difficulties
	***If any of these boxes are indicated, team is not eligible to be considered for any Project awards. Team must complete all elements of the Challenge Project assignment to be considered for Project awards.*			

TEAMWORK RUBRIC

	Needs Improvement	Fair	Good	Excellent
Roles & Responsibilities	No clearly-defined roles	Loose role assignments	Defined roles	Clearly defined roles
	Not clear who completed which tasks and/or very uneven distribution of work	Uneven work distribution	Work is distributed fairly, but with individual focus only	Workload is distributed fairly and team members understand each other's roles
	Team members not collaborative	Team members will help each other, if asked	Team members assist each other without being asked	Team members fill each other's roles (happily!), if needed
	Time management is poor or purely directed by the coach	Time management skills are weak	Team mentions learning time management	Team members give concrete examples of learning time management
Gracious Professionalism	Team members show little/ no respect for each other	Team members show limited respect for each other	Team members show respect for teammates	Team members give concrete examples of respect for teammates
	Team members show no awareness of school/ community issues	Team members show limited awareness of school/community issues	Team members imply increased awareness of school/community	Team members show increased awareness of their school/community issues, including concrete examples
	Team members compete with each other to be heard during judging	Team is aware of Gracious Professionalism, but gives no concrete examples of what they have done to help others	Team members are vague about how this awareness translates into other aspects of their lives	Team members clearly discuss how this increased awareness translates into other areas of their lives
	Team doesn't understand the concept of Gracious Professionalism	Team did not help each other/ other teams	Team implies that they have helped each other/other teams	Team members give concrete examples of how they have helped each other/ others

Problem-Solving & Team Dynamics	A problem was identified, but no steps were taken to identify a solution	A problem was identified, but the chosen solution was inadequate to some team members	A problem was identified and there is compromise evident in the solution	A problem was identified and the team worked together to find a solution
	One team member used power to reach their desired outcome	Some team members didn't accept the solution	Team tested various solutions to solve the problem	Various solutions were tested and then incorporated
	One person's ideas are used	Simple majority had input at meetings	Cooperation is a dominant theme	Team accepts input from all and sees the big picture in their overall goals
	Team members working against each other	Decisions made by simple majority without collaborative discussion	Decisions made by most of the team, however focuses on individual tasks	Team members show equality and value each other's roles by entire team making decisions
	Coercion and/or confrontation dominate	Team coexists peacefully	Team collaborates well	Collaboration and co-ownership are dominant themes with the members recognizing interdependence
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 spoke to the judge(s) 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 Core 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