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| Slide 1 |  | Welcome to *FIRST* LEGO League Robot Design Judge Training. |
| Slide 2 |  | This part of the training will prepare you to judge FLL team robots and their design processes. |
| Slide 3 |  | The Robot Game often generates the most attention of all the components of *FIRST* LEGO League. Robot Design Judges need to be familiar with the Robot Game rules, missions, and Updates that are regularly posted throughout the season. Teams and Judges can find the Challenge on the *FIRST* LEGO League website. The full Robot Game Challenge document is also included in the Robot Design Judge Prep Pack. |
| Slide 4 |  | The Robot Design Judging session is a design review. The teams have spent the season designing their robot to accomplish this year’s challenge. The judging session will last at least 10 minutes and take place in a separate judging area. The judging area should include a Robot Game Table with a Field Set Up Kit.  During the judging sessions, teams will demonstrate their design process, programming, strategies, and technical knowledge. |
| Slide 5 |  | During the Robot Design judging sessions, teams will often begin with a presentation. In many regions, the teams may prepare a Robot Design Executive Summary and present it at the beginning of the session. A great way to begin the Robot Design session is to ask teams if they have a presentation to share. If not, you might start by asking “tell me about your robot.”  Teams may, at their choice, demonstrate at least one Robot Game Mission during the Robot Design session. It’s not important by itself whether the mission is successful. Teams often find that the Robot Game tables in judging rooms are not as high quality as official game tables and their robots don’t perform the same as they will on the official tables or during practices. Instead, watching the robot allows you to gain information about how the robot moves, whether the mechanics work as intended, balance of speed and power, and other factors.  Finish the judging session by asking teams questions to learn more about their robot or design process. If teams do have a presentation, it’s best to not interrupt them with questions.  Although it may seem tempting to separate the team into programmers and builders, FLL teams should be judged all together. |
| Slide 6 |  | The FLL Partner for each region decides whether teams will be required to present a Robot Design Executive Summary. If it’s used in your area, be sure to review the instructions provided to teams, so you’ll know what to expect. Like the Core Values Poster, the Robot Design Executive Summary is intended to serve as a tool for teams to communicate information to judges.  Robot Design Executive Summaries consist of a short presentation, less than 4 minutes long. It should include Robot Facts and Design Details, and end with a trial run of a Robot Game Mission. Teams are NOT required to provide a written copy or other handout. |
| Slide 7 |  | As you decide what questions to ask, choose those which will help you complete the rubric. Be sure to ask about any items on the rubric if you need more information.    As mentioned in the general FLL Judge training, good questions are open ended, contain only one idea, and lead the team to provide the information you need. A few good questions are “How did you get your robot to stay together?” “What did you do make your programs understandable and easy to use?” and “What part of your design do you think us unique to your team?”    Refer to the Judge Prep pack for a helpful list of sample questions. Consider making a list of standard questions you’ll ask every team, but also be ready to ask each team the right questions to help you complete the rubric. |
| Slide 8 |  | The *FIRST* LEGO League Robot Design rubric represents a set of criteria on which to evaluate teams’ robots and design processes.    The rubric is divided into 3 skill areas:  Mechanical Design;  Programming; and  Strategy and Innovation.    Each team should be judged on the information that they provide in the Judging room, rather than information from another source.  While each rubric criteria is equally weighted, they are interdependent. For example, a durable, simple design should be considered better than one that is highly innovative but fragile. |
| Slide 9 |  | Mechanical Design covers Durability, Mechanical Efficiency and Mechanization.    For Durability, Robots should be able to withstand the rigors on the field without having pieces break off on contact.    Under Mechanical Efficiency, Robot structures and attachments should show a judicious use of parts. However, do not penalize teams for adding small bits of “flair”. Remember the core value “We have fun!”  In Mechanization, look for effective mechanical components that balance speed and power. |
| Slide 10 |  | Programming covers programming quality, efficiency, automation/Navigation.    Programming quality is judged by how consistently the robot performs. Examples would be audible checks or a simplified menu system that teams use to organize the sections of code that they need for specific missions.    In Programming Efficiency, the goal is to encourage teams to develop modular code. Look for code that is portable, flexible and reusable.    Automation/Navigation means that the robot operates with minimal drive intervention. A prudent use of sensors is much more efficient than physically pointing the robot at a target. |
| Slide 11 |  | Strategy and Innovation includes design process, mission strategy and innovation.    In Design process, judges should look for teams to explain their development cycles. Use of testing cycles where systematic processes are used is better than trial and error.    Mission Strategy is fairly straightforward. Determine whether the team has set goals and considered balancing risk and reward in their strategy.  Innovation is often a hard area to judge. Judges need to be on the lookout for creativity, uniqueness, cool attachments or programming tricks. Remember, innovation includes adding benefits, so make sure that the team can state the benefits of their cool feature. Innovation should be judged relative to the other teams at your tournament – it’s okay if you’ve seen the design elsewhere if it’s used in a different way than other teams at your tournament. |
| Slide 12 |  | The rubric is divided into the three Robot Design sub-areas. |
| Slide 13 |  | As a judge, you’ll evaluate team performance in each rubric criteria. From beginning to exemplary, each rubric area specifies the team behavior you should see at that level. You can mark “ND” for “Not Demonstrated” if the team doesn’t provide any information to help you assess what they did.  In FLL, we’d like every team to strive for the “Accomplished” level. One approach to evaluating a team is to start by assuming they are accomplished, then adjust their evaluation based on the team’s performance. |
| Slide 14 |  | Please provide as much written feedback as possible in the comments section of the rubric. Be sure to write a comment for each sub-area.    Teams will be very thankful for positive comments or well phrased “constructive” criticism that helps them improve. |
| Slide 15 |  | When taking notes, discussing teams, and completing rubrics, be specific and share examples or evidence that supports why the team achieved a particular evaluation. Specific comments are more helpful to teams than general impressions. |
| Slide 16 |  | When writing feedback for teams, recognize that teams work hard and treat them with respect.  Compliment the children’s achievements with vocabulary appropriate for the subject matter. Make sure you positively communicate opportunities to improve. Keep all your comments constructive.  When you first meet in your judging pair, determine a system to keep detailed notes, complete rubrics, and make comments in between teams so that you’ll stay on time while giving quality feedback. |
| Slide 17 |  | Here are a few good examples of comments that cite evidence for a team at the “Accomplished” level:   * *The use of a single design to connect your attachments helped ensure the durability of your robot.* * *Using documentation and single-purpose myBlocks helped team members understand programs others had written.* * *Use of larger wheels raised the robot chassis above the debris, but a change in design might improve the robot's center of gravity.*     Since time is short, don’t worry too much about writing full sentences, but focus on positively conveying why you placed the team at that level. |
| Slide 18 |  | At the bottom of the rubric, circle one or more areas of strength for the team. This acknowledges the team’s efforts and let’s them know that the judges recognized their strengths.    During initial deliberations, these strength areas may help you select teams for award nominations. |
| Slide 19 |  | In addition to the general award eligibility requirements, teams must follow the Allowable Equipment and Software rules in order to win any Robot Performance or Robot Design awards. Teams are allowed to bring additional parts to judging sessions, such as a second robot or a prototype attachment used during the design process, as long as they clearly identify the extra parts and that the extras are not being used on the table.  Most of the time, teams with high Robot Performance scores will also do well in Robot Design judging. When the high performance is not aligned, however, take a second look. Sometimes teams with a great robot design just have a bad day on the game tables or high scoring teams don’t have excellent designs. Robot Design judging is done separately from the Robot Game scores to recognize both great design and great performance. Robot Game scores should only influence Robot Design judging when you’re having a hard time deciding between two teams who are otherwise equal.  Core Values is just as important within Robot Design as the other judged areas. If you find that a team doesn’t understand or can’t explain how they came up with their robot design or programming, you might have a concern about adult intervention. Report any concerns to the Judge Advisor so they may be further investigated. |
| Slide 20 |  | In order to be fair and equitable, the robots used for *FIRST* LEGO League have a list of allowable parts and software.    The allowable equipment and software are listed in the Robot game rules.  Allowable RCX, NXT, and EV3 parts include the controllers and the Sensors pictured here. |
| Slide 21 |  | Equipment allowed also includes the RCX, NXT, and EV3 motors pictured here. FLL teams are now allowed to include four motors on their robots.  Teams are also allowed to use the lamps, cables, batteries or battery packs in the quantities listed in the Challenge document.  Read the Robot Game rules carefully, so that you’re familiar with the types and quantities of parts from all three generations of LEGO MINDSTORMS robotics kits. Note that parts not shown in the pictures are not allowed, including items that may be sold by LEGO but are not manufactured by LEGO. |
| Slide 22 |  | Here is the allowable software.  LEGO MINDSTORMS  ROBOLAB  LEGO MINDSTORMS NXT-G  LEGO MINDSTORMS EV3 |
| Slide 23 |  | software that is NOT ALLOWED includes  Text based and “outside” software such as Custom NXT-G blocks, Labview and RobotC.  Software options are limited because team coaches have varying experiences with programming. Like the equipment rules, the software limits help give every team an equal foundation. |
| Slide 24 |  | So, how will you know which teams to consider for awards?    The teams who win awards will stand out from other teams. You’ll see that they often:   * Have autonomous robots that accommodate variances in field set up kits and tables * Collect their own data to support or test design choices. For example, using mission repeatability data to choose between two chassis designs. * Explain and follow a clear design process, including documented programs, design features, and decision making * Explain the engineering and physics behind their robot design     Sometimes it’s easy to nominate the team for an award because they were memorable for their big, complicated robot or their high Robot Performance score. While teams who win awards might have those qualities too, look beyond their initial appeal to determine whether the other items on the rubric support them rising to the top for Robot Design.    Keep in mind that sometimes a great candidate for an award will be a team who fails to run a successful mission during the judging session. A great robot design might not perform in judging due to limitations in the way the Robot Design judging room was set up.    Now, what does a team at the “accomplished” level look like? Refer to your Judge Prep Pack for a detailed example of an accomplished team. |
| Slide 25 |  | You have many tools available to you as you prepare to be a Robot Design judge and make awards decisions at the tournament.    After completing this training, be sure to review the Robot Design Judging Prep Pack, which includes the Robot Design Judging Primer. The Prep Pack contains a more in depth discussion of each rubric criteria and provides additional tips for judges. You’ll want to review the rubric carefully and have a copy available as you answer the Robot Design Certification questions.  The Robot Design Judging Prep Pack includes the Challenge document for each season. It’s also available on the FIRST LEGO League website. Be sure to check the Robot Game Updates on the website before attending your tournament.  With all of these tools and guidance from the Head Judge and Judge Advisor, you’ll be well prepared to select the best teams to receive Robot Design awards at your tournament. |
| Slide 26 |  | Now is a great time for a little practice. Begin by reviewing the Robot Design Rubric, available as part of the Robot Design Prep Pack or the FIRST LEGO League website.    Next, find a video of a team at a Robot Design Judging session at a past tournament. You might search YouTube or other video sharing sites or use a video provided by your FLL Partner or Judge Advisor. While you watch the video, think about what questions you would ask the team. Then, complete a practice rubric for the team based on what you saw.    If possible, ask another person to review the video with you. Then pretend you’re part of a judging pair with that person, compare notes and complete one rubric together as you would at a tournament. |
| Slide 27 |  | Thank you for completing Robot Design Judge Training! Be sure to answer the Certification questions in order to complete Robot Design Judge Certification. You’ll need to receive at least 80% to pass, but you can try again if you need to do so.    You should now be prepared to serve as a Robot Design Judge at an official *FIRST* LEGO League event. We hope you have a great time and consider volunteering for another *FIRST* event in the future. |
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