

## Robot Design Judge Certification Questions Answer Key

1. Which of the following is allowed on FLL robots?
  - a. Duct tape  
(Incorrect. Duct tape is not allowed on FLL robots since it is not manufactured by LEGO. The EV3 Medium Servo Motor is allowed.)
  - b. HiTechnic Gyro Sensor  
(Incorrect. The HiTechnic Gyro Sensor is not allowed on FLL robots since it is not manufactured by LEGO. The EV3 Medium Servo Motor is allowed.)
  - c. EV3 Medium Servo Motor  
(Correct! The EV3 Medium Servo Motor is manufactured by LEGO so it is allowed on FLL robots.)**
  - d. Mega Bloks  
(Incorrect. Mega Bloks are not allowed on FLL robots since they are not manufactured by LEGO. The EV3 Medium Servo Motor is allowed.)
  
2. What should you do if you suspect a team with extensive subroutines and variables in their code didn't do the programming themselves?
  - a. Rank the team low, since the team could not have done such sophisticated programming without adult assistance.  
(Incorrect. After asking the team to explain their programming in detail, use the rubric to evaluate the team. After the session, if you still have concerns about adult involvement, notify the Judge Advisor, who will investigate further.)
  - b. Rank the team high, since their programming skills are more advanced than most other teams  
(Incorrect. After asking the team to explain their programming in detail, use the rubric to evaluate the team. After the session, if you still have concerns about adult involvement, notify the Judge Advisor, who will investigate further.)
  - c. Ask the team to explain their programming in detail and describe how they came up with the ideas they included in their programs  
(Correct! After asking the team to explain their programming in detail, use the rubric to evaluate the team. After the session, if you still have concerns about adult involvement, notify the Judge Advisor, who will investigate further.)**
  - d. Ask the team which adult programmed their robot for them

(Incorrect. Start by asking the team to explain their programming in detail and then use the rubric to evaluate the team. After the session, if you still have concerns about adult involvement, notify the Judge Advisor, who will investigate further.)

3. Which is the best example of a question you might ask a team to learn about their design process?
  - a. **How did you solve the greatest design or programming difficulty you encountered?**  
**(Correct! This question is open-ended but still leads the team to provide the information you need to assess their design process.)**
  - b. Why didn't you choose a design that would be better at driving straight?  
(Incorrect. This question could be more open-ended and positively phrased. Instead of identifying the design flaw for the team, you might ask the team to explain their greatest design difficulty and how they chose to solve it.)
  - c. What makes your robot better than other teams' robots?  
(Incorrect. This question is not in the spirit of friendly competition. Instead, you might ask the team to explain their greatest design difficulty and how they chose to solve it or ask the team to explain the best features of their robot and how they designed each feature.)
  - d. Where did you come up with the design for your robot?  
(Incorrect. A better question will more directly lead the team to provide the information needed, such as asking the team to explain their greatest design difficulty and how they chose to solve it.)
  
4. A team uses subroutines in their programming and has extensively and simply commented their code. At what level should they be marked on the rubric in the Programming Efficiency category?
  - a. Beginning  
(Incorrect. This team can be placed at the Exemplary level since they have streamlined code that is easy for anyone to understand.)
  - b. Developing  
(Incorrect. This team can be placed at the Exemplary level since they have streamlined code that is easy for anyone to understand.)
  - c. Accomplished  
(Incorrect. This team can be placed at the Exemplary level since they have streamlined code that is easy for anyone to understand.)
  - d. **Exemplary**

**(Correct! Teams at the Exemplary level have streamlined code that is easy for anyone to understand.)**

5. A team's robot is programmed using timing to leave base, complete two missions, and return to base. Sometimes the wheels slip on the mat and interrupt the timing. They should be marked as "Developing" on the rubric in what category?
  - a. Mechanization  
(Incorrect. Since accuracy is also important under Mechanization, determine whether the issue is with the team's programming or their robot design. In this example, the problem should be reflected under the Programming Quality category.)
  - b. Durability  
(Incorrect. The Durability category is focused on the need for repairs to the robot design. Instead, since this team's programs achieve their intended purpose but work inconsistently, they should be placed as Developing in Programming Quality.)
  - c. **Programming Quality**  
**(Correct! Programming Quality addresses whether programs are appropriate for their purpose and should achieve consistent results, assuming no mechanical faults. A team with programs that achieve their intended purpose but work inconsistently is at the Developing level in Programming Quality.)**
  - d. Programming Efficiency  
(Incorrect. The Programming Efficiency category focuses on whether programs are modular, streamlined, and understandable. Instead, since this team's programs achieve their intended purpose but work inconsistently, they should be placed as Developing in Programming Quality.)
  
6. During the mission demonstrated by a team during the judging session, pieces frequently fall off the robot. What level should the team should be marked at on the rubric in the Durability category?
  - a. **Beginning**  
**(Correct! Since this robot is quite fragile and breaks a lot, mark them as Beginning in Durability.)**
  - b. Developing  
(Incorrect. Since this robot is quite fragile and breaks a lot, mark them as Beginning in Durability. During a real judging session, you may use your judgment to determine whether the robot's is "quite fragile" and belongs at

- Beginning or has “frequent or significant repairs” needed and should be marked as Developing.)
- c. Accomplished  
(Incorrect. Since this robot is quite fragile and breaks a lot, mark them as Beginning in Durability.)
  - d. Exemplary  
(Incorrect. Since this robot is quite fragile and breaks a lot, mark them as Beginning in Durability.)
7. A team describes how they divided into three groups to tackle the missions they thought would score the most points. In what category should this team be marked as “Accomplished” on the rubric?
- a. Innovation  
(Incorrect. The Innovation category focuses on the robot having new or unique features. Instead, this team describes a clear Mission Strategy.)
  - b. Automation / Navigation  
(Incorrect. The Automation / Navigation category focuses on the robot’s ability to use mechanical or sensor input to move as intended. Instead, this team describes a clear Mission Strategy.)
  - c. Programming Quality  
(Incorrect. The Programming Quality category focuses on the program’s ability to achieve consistent results. Instead, this team describes a clear Mission Strategy.)
  - d. Mission Strategy**  
**(Correct! This team describes a clear strategy to choose and accomplish several missions.)**
8. True or False? A team that does not accomplish their demonstrated mission during Robot Design Judging should be ranked lower than a team who completes a mission during judging.
- a. True  
(Incorrect. Teams often find that the FLL Game tables in judging rooms are not of the same quality as the official competition Game Tables. Avoid penalizing teams for failures caused by the variability of the environment and instead, use any demonstrated missions to gain information about the mechanization, speed, and durability of their robot. Always rank teams based on their overall robot design performance.)
  - b. False**  
**(Correct! Teams often find that the FLL Game tables in judging rooms are not of the same quality as the official competition Game**

**Tables. Avoid penalizing teams for failures caused by the variability of the environment and instead, use any demonstrated missions to gain information about the mechanization, speed, and durability of their robot. Always rank teams based on their overall robot design performance.)**

9. True or False? When a team is being considered for a Champions Award or a Robot Design award, Judges should do some additional investigation if their Robot Game score rank significantly differs from their rank in Robot Design judging.
- a. **True**  
**(Correct! Teams who do well in Robot Design Judging often also do well in the Robot Game. If their ranks in judging compared to performance are much different, Judges should attempt to determine whether the team with the great design is having a bad day, a team with a simple design is very effective, or if any other factors are influencing the team's scores.)**
  - b. **False**  
(Incorrect. Teams who do well in Robot Design Judging often also do well in the Robot Game. If their ranks in judging compared to performance are much different, Judges should investigate further and attempt to determine whether the team with the great design is having a bad day, a team with a simple design is very effective, or if any other factors are influencing the team's scores.)
10. True or false?: It is acceptable to ask teams to split into builders and programmers during your Robot Design judging sessions.
- a. **True**  
(Incorrect. FLL teams should be judged all together, rather than split into separate groups during judging sessions. Often, team members work on many parts of the robot or may be able to help answer a question addressed to another team member.)
  - b. **False**  
**(Correct! FLL teams should be judged all together, rather than split into separate groups during judging sessions. Often, team members work on many parts of the robot or may be able to help answer a question addressed to another team member.)**
11. A team does not provide any information about their design process. What is the best practice for evaluating the team on the rubric for that category?

- a. **During the judging session, ask the team about the missing information and mark the rubric appropriately based on their answers, and if the team still does not provide information, mark “ND” on the rubric for not demonstrated.**  
**(Correct! As the judging session progresses, keep notes about each rubric item. If a team has not provided any information about their design process or any other category, ask questions that lead the team to provide the missing information. If you still have no information, select the “ND” category.)**
  - b. After the judging session, mark the “Beginning” box on the rubric, since the team has not shown a higher level of accomplishment in that area.  
(Incorrect. For each rubric category, each level describes specific behavior from the team. If a team does not provide any information about any category, ask questions that lead the team to provide the right information, and if you still have no information mark them as “Not Demonstrated.”)
  - c. After the judging session, mark the “ND” box on the rubric, since the team has not demonstrated anything in that category  
(Incorrect. Judges should keep notes during the judging session to help them complete the rubric. If a team does not provide any information about any category, ask questions that lead the team to provide the right information. If you still have no information, you may mark them as “Not Demonstrated.”)
  - d. After the judging session, find the team and ask them to provide more information about their design process and adjust your rubric evaluation accordingly.  
(Incorrect. Rather than changing a rubric after a judging session, keep notes during the judging session that help you complete the rubric. If a team does not provide any information about any category, ask questions that lead the team to provide the right information. If you still have no information, then mark them as “Not Demonstrated.”)
12. What is the best way to re-word a comment on a rubric that says, “Your team deserves the Champion’s Award. You were the best team we have seen today.”?
- a. Your team did an outstanding job in Robot Design. We hope you win an award!  
(Incorrect. Since awards decisions haven’t been made at the time rubrics are completed, it is too early to suggest the team might win an award. You’re also only judging one of the three judging areas. Instead, compliment what the team did well and provide a helpful item for improvement.)
  - b. Your team did a much better job at explaining your robot design than any other team we have seen today.

(Incorrect. Avoid comparing a team to others at the tournament when evaluating and commenting using the rubric. Instead, compliment what the team did well and provide a helpful item for improvement.)

- c. We were impressed with your robot. Great job!  
(Incorrect. This comment doesn't give the team any meaningful feedback to help them be even better in the future. Instead, compliment what the team did well and provide a helpful item for improvement.)
- d. **Your robot design was outstanding. Consider fine-tuning your solution and exploring ways for your robot to accomplish additional missions!**  
**(Correct! This comment appropriately praises the team for being outstanding in Robot Design. Teams at the Exemplary level can still improve.)**

13. What is the best way to re-word a comment on a rubric that says, "Your robot didn't work very well."?

- a. Your robot used a lot of parts and didn't finish many missions.  
(Incorrect. This leaves a lot open to interpretation and focuses on the negative. Instead, find a way to give suggestions for improvement, like considering researching techniques to improve durability.)
- b. **Your team spent a significant amount of time on repairing the robot. You might want to research techniques to make your robot more durable.**  
**(Correct! This comment provides evidence of what the judges observed and gives specific suggestion on how the team can improve without focusing on the negative.)**
- c. The attachments for your robot were much too complicated and didn't work as intended.  
(Incorrect. This comment is focused on opinion and could be more action-oriented. Instead, find a way to give suggestions for improvement, like streamlining use of parts.)

14. What is the best way to re-word a comment under the Programming category the rubric that says, "Why didn't you use sensors?"

- a. You should have used sensors to more effectively navigate.  
(Incorrect. This is a little better since it provides a suggestion, but gives a too prescribed solution without being helpful. Instead, give a few specific, positive options for improvement.)
- b. **Consider using touch sensors or modifying your programs to better align the robot with mission models.**  
**(Correct! This comment gives specific, helpful suggestions for improvement and links back to the rubric criteria.)**
- c. Change your programming so you can navigate better.

(Incorrect. This comment prescribes just one solution and is very directive. Instead, give a few specific, positive suggestions for improvement.)

- d. Pick different missions so that your robot has a better chance to complete them.

(Incorrect. This comment is more appropriate for the Mission Strategy section of the rubric, rather than Programming and needs to be more positive. Instead, give a few specific, positive suggestions for improving their programming.)