Core Values Judging Primer

Core Values may initially seem more difficult to judge than Robot Design or Project. There is a tendency by some to consider Core Values judging to be inherently more subjective than the other two areas because “data” for criteria such as Discovery, Inclusion and Coopertition are perceived to be difficult to obtain or use to differentiate teams. While Core Values elements may be less tangible, a number of tools and techniques exist to help judges gain insight about teams, and reinforce for all why Core Values and Core Values judging is such an important component of FLL.

As a judge, here are some overall things to consider:

- There is tendency for teams that “practice” Core Values “speeches” to be looked upon unfavorably by some judges. The premise is that these teams are just acting to score well with the judges. However, teams should practice talking about Core Values just like they practice their Project presentations and Robot mission runs. The more they practice Teamwork activities and talk about Core Values, the more they internalize these abstract ideas.
- Remember that you are evaluating how a team approaches Core Values throughout the season in addition to what they do at the tournament. The journey of the team and how much they learn and grow are important.
- Teams (including coaches, mentors, parents and others associated with the team) must uphold and display FLL Core Values at all times, not just during Core Values judging sessions.
- Information about Core Values criteria can be obtained in several ways. Many Core Values judging sessions will include a Teamwork Activity and/or Core Values Poster to help judges observe and learn about specific behaviors, as well as focus and guide the discussion and interview time more effectively.

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<th>Rubric Criteria</th>
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<td>Discovery</td>
<td>Core Values Poster</td>
<td>What we discover is more important than what we win.</td>
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<td>Kids Do the Work</td>
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<td>We know our coaches and mentors don’t have all the answers; we learn together.</td>
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<tr>
<td>Inclusion</td>
<td>Core Values Poster</td>
<td>We honor the spirit of friendly competition.</td>
</tr>
<tr>
<td>Respect</td>
<td>Observation</td>
<td>We display Gracious Professionalism™ in everything we do.</td>
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- For instances where the whole judging session is a presentation/interview/Q&A, all the information must be gathered through conversations with the team.
- When Core Values judging includes a Teamwork Activity, a great deal of information can be learned from direct observation of the team working through the activity. It is important to remember that the purpose of the activity is to observe the team working on the problem, and not to focus on the result of their work.
- When a Core Values Poster is required, it should be used as a tool to jumpstart a conversation between the team and the judges. It is designed to help teams focus their thoughts and examples in advance of the judging session so that they may be conveyed more easily and effectively to the judges.
In addition to the judging sessions, many Core Values judges like to observe the teams in their natural environment, the pits and competition area to gather additional data about all aspects of Core Values.

Now let’s take a closer look at the rubric criteria and provide some guidance about what to look for and consider:

**Inspiration**
These three criteria measure how effective a team is at getting teams and others excited about science and technology while gaining awareness and understanding about the world and themselves.

**Discovery** – Teams must be able to describe how they balance all three aspects of FLL, especially if they really wanted to focus on only one sometimes. They should provide examples from the season about things their team discovered that were more about gaining knowledge than about gaining an advantage in the competition or winning an award.

**Team Spirit** – The important thing to look for here are teams that are enthusiastic and spirited about their team and FLL. It’s not about yelling the loudest, but rather about establishing a cohesive team identity, having a good time with your team and showing a great FLL spirit to people outside the team.

**Integration** – Look for concrete examples of how a team applies Core Values and other things learned through FLL, to situations outside of FLL. Listen for stories about how teams integrate new knowledge, skills and abilities into everyday life.

**Teamwork**
All teams operate differently, and teams can be successful with different styles. Some teams have a strong leader, some have a democratic approach, some have specialized roles, some share responsibilities for all aspects. Sometimes teams that predominately use one approach will even adapt their style depending on the problem. When evaluating teamwork, it is important to know that one “type” of team is not better than another. What matters is whether the team is aware of the approach they use (and its risks), and how successful they are at getting things done.

**Effectiveness** – No matter the approach used, a team should have a clear process to make decisions and resolve problems appropriately. Additionally, goal setting and realizing progress towards goals helps teams take ownership of their experience in FLL.

**Efficiency** – Judges need to assess whether teams used their time, energy and other resources wisely. Accomplished teams know how to manage roles and their time to ensure most goals are achieved --and they know how to self-correct if they veer off course.

**Kids Do the Work** – This is hopefully fairly self-explanatory. It is all about how much direct involvement there is by the coach. It is allowable (actually encouraged!) for coaches to be involved. We just don’t want them programming robots, performing research, dictating ideas and making decisions that the team should be making about what they are doing.

**Gracious Professionalism™**
**Inclusion** – Look for how well a team incorporates ideas from everyone and makes each team member feel like a valued part of the team. Determine how well the team understands that working together allows them to accomplish more than they could by working alone. An Accomplished team will exhibit balanced involvement, with most team members actively contributing ideas.

**Respect** – Judges must look beyond teams that show good manners and are a “nice group of kids”. We expect decent behavior to be the norm. Accomplished teams act and speak with integrity; they understand that what they say and do has the power to impact others and situations.
Coopertition™ – Look for ways that a team honors the spirit of friendly competition, including any assistance provided or received from other teams. Determine how team members help each other and other teams, prepare for and approach potentially stressful competition experiences throughout the season.

Project Judging Primer

Project judging in FLL can be compared to research presentations given at a scientific conference, except FLL project presentations are typically a whole lot more fun! Teams present a challenge-related problem they have researched and analyzed. They also present their innovative solution to that problem, and tell about how and with whom they shared their research. These steps parallel the scientific research process in the “real world”. All of this information is communicated in a creative presentation to the judges that takes no more than 5 minutes, including setup time.

As a Project judge, here are some overall things to consider:

- To be eligible for any Project awards, teams must demonstrate that they have completed all three components of the Project: problem identification, development of an innovative solution, and sharing of the project with others.
- Make sure that teams also complete any additional challenge-specific requirements. For example, in the Power Puzzle season, teams had to perform an energy audit as a part of the Project.
- Innovation and creativity are considerations in several of the Project rubric criteria. Try not to overly penalize a team for a solution they present as original, but that you know is already being considered or implemented. Different judges may also have very different knowledge levels of state-of-the-art science relative to the Project. If you are aware that their solution already exists, make it known to them in a respectful, gentle manner, and MAKE SURE you provide them that feedback.

Now let’s take a closer look at the criteria and provide some guidance about what to look for and consider:

**Research**

**Problem Identification** – For teams to rate Accomplished or higher, they must be able to clearly articulate a well-defined problem statement. Sometimes teams will present a set of issues related to the challenge but not focus on a specific problem. For example, global climate change is a very broad problem that could have many causes. A more specific and well defined problem that would make a more appropriate FLL Project might be something like reducing greenhouse gas emissions from coal burning power plants.

**Sources of Information** – The key things to look for here are quality, variety and number of sources. Accomplished teams should include at least one professional they have communicated with as a source. Note that books or news articles or magazines that a team reads via the internet should be considered as three different types of sources. Exemplary teams will consider a wider variety of good quality sources as well as seek out and learn from professionals. Professionals are considered to be people who have specialized knowledge about a particular area. For example, a biomedical engineer might be considered a professional when it comes to research concerning robotic arms used to replace lost limbs. Another example could be a shipping logistics manager who is consulted when researching how food is shipped long distances while still maintaining quality.

**Problem Analysis** – Accomplished teams will analyze a problem sufficiently to form their own conclusions. For example, a team that performs its own tests of various ice melting materials to determine their effectiveness when researching
the problem of motor vehicle movement in snowy and icy climates is a good example of a team performing its own analysis.

**Review Existing Solutions** – Teams should perform a good faith effort to review existing solutions and determine the originality of their solution. Teams are not expected to perform an exhaustive literature search including the very latest scientific journals to determine originality.

**Innovative Solution**

**Team Solution** – Similar to the Problem Identification requirements, the team’s solution should focus directly on the problem they are trying to solve, explain how it solves that problem, and be clearly stated.

**Innovation** – The main issue of subjectivity here surrounds the question “What does ‘original’ mean when it comes to innovation?” A team may develop a truly innovative device to assist someone who is blind, or they may come up with the idea to apply Velcro to walls to serve as a sensory guide; both are innovative. Teams will sometimes believe their solution to be something they’ve developed on their own only to find out from an expert judge that some other group has already developed that same solution. They may also find this out days before the competition and not have time to develop a new, completely original solution. Be sensitive to these situations. A team does NOT have to develop a completely new, patented by the team idea to be considered for this award or to score high in this area. Note that FLL has a separately judged, non-event based award called the Global Innovation Award for teams that choose to pursue a patent opportunity.

**Implementation** – Teams should demonstrate that they have considered how their solution might be implemented. Team solutions should be more grounded than pie in the sky, but solutions need not be implementable now. For example, a team should not be penalized for a solution that may require the invention of an additional component to be workable. While not required, a team that builds a prototype of their solution should most likely be considered Exemplary, provided they consider other aspects of how to implement their solution.

**Presentation**

**Presentation Effectiveness** – Look for well-organized presentations that clearly deliver the message. Note that the presentation MUST demonstrate all three of the project aspects. It is not sufficient to cover Sharing (for example) only during the question and answer part of the judging session.

**Creativity** – This criterion is probably the most subjective one for Project judges. Creativity is different for different people. Look for presentations that stand out, are more entertaining, make you want to listen to the message more and serve to enhance the delivery of the message instead of distract from it.

**Sharing** – The two main considerations here are “Did the team consider who might benefit from their solution, and share it with them?” and “Did the team go beyond their comfort zone to share their ideas?” The first consideration focuses on encouraging teams to share with a relevant and targeted audience, for example presenting a new insulin delivery system to kids with juvenile diabetes. The second consideration focuses on encouraging teams to share their information with people they don’t know so that they can become comfortable speaking about their ideas with anyone. Note that a team does not necessarily have to share its FLL competition presentation with outside groups; they may share the information and their solution in any manner they wish.
Robot Design judging in FLL can be compared to an engineering design review in the “real world”. Design teams present their robots to panels tasked with selecting the robots that best meet the requirements (completion of missions) given constraints like size, parts usage and software. The natural inclination for engineers and technical people is to say, “There is an easy test to see which robots are best – the competition!” However, in FLL, and often in the “real world”, decisions are made based on how well a team can explain their design and all the things they considered while developing it. The FLL Robot Design rubric represents a set of criteria that we feel are important “takeaways” from participating in the design of an FLL competition robot. They are analogous to evaluation criteria used when selecting between competing designs. Judges gather information about teams’ mechanical design, programming and overall design process to evaluate a team and its robot.

As a judge, here are some overall things to consider:

- The Robot Design judging session is more about the team's ability to present the robot and all the thoughts and considerations that went into their final product than it is about its performance. The performance is covered under the Robot Performance Award. The judging session is the time for the judges to learn from the teams the design processes they used to make decisions and gain understanding; it also allows discussion so that judges can be sure that the teams did the work.
- You may ask teams to perform missions with their robot on the judging table. Give teams the benefit of the doubt should these missions not work successfully all the time. Judging tables and field setup kits are not usually built or maintained to the same standards as competition ones. There is also a tendency for Murphy’s Law to rule in these sessions and for teams to be nervous and mistake prone when running missions in a judging setting.
- Teams may bring additional prototypes of their robot or attachments into a judging session. Sometimes these prototypes utilize additional electrical parts beyond those allowable in competition. Remember that electrical parts and software rules apply only to the robot used in the competition itself, and that extra parts or software used by teams to demonstrate designs are perfectly allowable.
- Simpler is usually better. Don’t be overly impressed with complicated robots. The complication must be used for a purpose.
- Remember that this is an engineering challenge for autonomous robots. Small imperfections in the field, mission models and environmental variations must be considered by Accomplished and Exemplary teams.

**Mechanical Design**

**Durability** – The robot should be able to withstand the rigors of the competition, for example it should be able to contact walls or missions models without pieces falling off or breaking. Attachments should be similarly robust. Long arms that delicately grip a lever aren’t very effective if they don’t stay attached to the robot.

**Mechanical Efficiency** – Here the judges are looking for robot structures and attachments which show a judicious use of parts. For example, using six pins to tie two beams together is not as efficient as using one at each end. One note here: don’t over penalize the teams for adding small bits of “flair” or pieces that are fun for them to use to express their creativity. Remember the Core Value “We have fun!”

**Mechanization** – Judges look here for how the robot moves and operates. They look to see whether the robot balances speed and power.
Programming
Just as with Mechanical Design, simplicity is desired when it comes to programs. Teams can develop amazing programs that aren’t necessarily better than simple programs that perform the same purpose.

Programming Quality – The robot’s programs should work consistently, producing the same results every time. Examples of quality code could include audible checks or a simplified menu system that teams use to make sure they are running the appropriate section of code for a particular mission. Be careful to attempt to assess how the robot’s programs would operate independent of mechanical faults.

Programming Efficiency – The goal here is to encourage teams to develop code that is modular, portable and flexible, so that it can be used in multiple situations. This criterion also addresses readability and documentation of code, both of which are good programming practices.

Automation/Navigation – Autonomy in FLL means that the robot operates with minimal driver intervention. Retrieving a robot and taking a touch penalty may be part of an acceptable strategy for a team, but it is still driver intervention. So for this instance, a team might have an Accomplished Mission Strategy, but only score Developing for Automation. This criterion also doesn’t distinguish between sensor use/feedback and mechanical feedback. For example, it is valid for a team to use an aligning jig in base followed by a robot using the wall or a mission model to align itself before activating an attachment. It is also just as valid for a team to use a light sensor to follow a line to the same mission model. Teams should try to avoid just using driver aiming, motor rotations and timing to navigate the field, as these methods often become unreliable under variations in field or environmental conditions. Remember that lack of sensors isn’t necessarily a bad thing. Lack of Automation, however, should be considered.

Strategy & Innovation
Remember that Strategy and Innovation can be seen in Mechanical Design or Programming, as well as the integration of both.

Design Process – Accomplished teams move beyond a trial and error approach to robot improvements to utilize testing cycles where systematic processes are used. Frequently you will hear teams say, “We tried a lot of different things and this one was the best.” You are looking for more details and more organization to their process than that for teams who are Accomplished or Exemplary.

Mission Strategy – This is fairly straightforward. Judges can ask teams, “What is your strategy to complete the missions?” and “How did you make decisions to support that strategy when designing your robot?”

Innovation – This is often a hard area for judges to judge. Things to be on the lookout for here include creativity, uniqueness, a cool attachment or programming trick, or something similar. Most competitions will have one or more robots that will have some feature that captures the judges’ attention. Remember that Innovation implies added benefit, so make sure that the team can state the benefits of their cool feature.