Judge Guide

Overview

Thank you for volunteering as a Judge at a VEX IQ Challenge event. This guide will help Judges, Judge Advisors, and Event Partners understand and follow a consistent judging process. The judging process in this guide is consistent with the judging process used at the VEX Robotics World Championship. Judges at local and State/Regional/Provincial events must follow the judging process outlined in this guide. **Official events may not change award criteria in this guide. Events not following the award criteria in this guide may not qualify teams to higher level events.**

Event Partners should make the Judge Advisor aware of concerns about the behavior or ethics of a team using the "Field Note to Judges" form, or some other form of communication that is agreed upon by the Event Partner and Judge Advisor.

New This Year

Major changes to this year's version of the Judge Guide include:

- Removed STEM Research requirement from Excellence
- Changed the STEM Research Project to a video submission at all events
- The STEM Research Project is now an optional award at local events. The local Event Partner will determine if it is offered at an event
- Modified Excellence Award candidate identification process
- Updated the Design Award process
- Further defined notebook content
- Added note on Judges' Room

In the VEX IQ Challenge program, teams of elementary and middle school students showcase their knowledge and skills in designing, building, and programming a robot, and documenting their design process in an Engineering Notebook. All of these activities are to be completed by the students with minimal adult assistance.

It is important for Judges to **recognize student accomplishments** in the VEX IQ Challenge. Students must make the decisions, complete the work, and demonstrate their learning in the VEX IQ Challenge, in order for their team to qualify for official award recognition at events.

The students who participate in VEX IQ Challenge events represent diverse levels of maturity, skills, and experience. Your warmth, patience, and enthusiastic support of their learning and sharing will make a positive impact on these students on event day and beyond.

In addition to this Guide, training information is available to support your efforts at: roboticseducation.org/event-partners/event-partner-resources-documents/.

Adults are preferred to fill the role of Judges. In some cases, high school students may be paired with adults as Judges. Younger students are not to be used as Judges. Judges at State or Regional Championships must be adults; college students are a good source for Judges.

Judging deliberations should be **concluded *after*** the last qualifying match and ***before*** the tournament champions are known. The tournament outcome should not affect any Judged awards, including the Excellence Award. **Judges are to make all award decisions under the supervision of the Judge Advisor before leaving the event. Event Partners are not to make any decisions on any Judged awards. The Judge Advisor should oversee the entering of Judged awards on the Awards tab of Tournament Manager.**

Only a limited number of teams at each event will be awarded a Judged award. However **Judges should always interview every team at an event** regardless of the team's status in terms of contention for a Judged award or notebook submission.

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Key Concepts

Student-Centered Teams: The Robotics Education & Competition Foundation seeks to increase student interest and involvement in science, technology, engineering, and mathematics (STEM) by engaging students in hands-on sustainable and affordable curriculum-based robotics engineering programs across the U.S. and internationally. Judges play an important role in our efforts to ensure that our program remains student-centered.

Teachers/Mentors/Parents providing guidance and helping students design, fix or program robots is accepted. Adults doing the majority of the work on a robot, or working on a robot alone without students, is not acceptable, as there is obviously limited student learning and ownership taking place in such a situation.

Judges have the opportunity through observation and interviews to identify teams, schools and clubs that strive to keep their program student-centered and that understand the purpose of the program is to enhance the learning process, not to win at all costs. Judges, with input from event staff, should identify teams that are not student-centered.

Examples of this may include:

- Robots built entirely by adults or, in the case of younger student, mentors (i.e., high school students building robots for elementary or middle school teams).
- Identical robots on two or more teams (so called ‘clone-bots’).
- Adults who criticize students from alliance teams for poor performance, failure to perform optimally or who blame other teams for low scores rather than offering positive suggestions.

Judges should not reward teams that Judges have clearly identified as not student-centered with any Judged awards.

The Judges’ Room is where all notebook evaluations and judging deliberations should be conducted. The Event Partner should provide a room that provides Judges with the ability to hold frank, confidential discussions. It should be separate from rooms where other volunteers congregate and allow for Judges to post items on walls without teams or volunteers being able to see the judging materials.

Team Conduct: The REC Foundation considers the positive, respectful, and ethical conduct of all students and adults associated with a team to be an important and essential component of the VEX IQ Challenge program. For this reason, Judges will consider all team conduct by students and/or adults when determining award recognition at VEX IQ Challenge events.

Judges should use the confidential “VRC and VEX IQ Note to Judges from the Competition Fields” form to receive feedback on team conduct at events.

Pit Area: The area that teams use as their home base during an event is called the Pit Area. Teams are usually provided with a table for their robot, laptop, batteries, and other VEX parts. The Pit is also the work area for the teams. This is a great place to meet with teams in an informal setting and see them in a more relaxed environment. Judges at VEX Worlds visit teams in their pit areas to conduct student interviews for most Judged awards. Judges at local events should help prepare teams for the process at regional championship events and VEX Worlds by interviewing them in the pit area.

It may be difficult to catch teams in their pit area due to tight competition schedules. Additionally, larger teams may only have some of their team in the pit area, with the rest of the members congregating in the stands. If at first you are unable to locate a team in their pit area, feel free to leave them a note to inform them that the Judges are hoping to speak with them and/or check their pit area later. A standard Judges note to missed teams is available in this guide.

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Robot Game: Teams play the robot game in collaborative Teamwork Challenge matches and may also demonstrate their own team's skills in Programming and Driving Skills Challenges. All three robot challenges are played on the same 4' x 8' game field. The game field is a great place to see teams in action and to evaluate how well their robots perform. You can also get a good idea of the sportsmanship, energy, and enthusiasm of teams while observing them on the game field. For robot game details, please visit: roboticseducation.org/competition-teams/vex-iq-challenge/.

Event Partner (EP): Adult volunteer who organizes and coordinates the event.

Judge Advisor: Adult volunteer who coordinates the event judging process.

Judge Responsibilities

Judges are in a position of trust at VEX IQ Challenge events. To ensure that the judging process is an effective, equitable, and positive experience for all participants, it is important that Judges maintain:

- **Confidentiality**: The judging process often includes frank discussions about teams. These discussions must remain confidential and your judging team should take precautions to ensure that these discussions are not shared with or overheard by teams or other event participants.
- **Impartiality**: Proactively advise the Judge Advisor or Event Partner of any possible conflict(s) of interest and remove yourself from all discussions and decisions in which you may have a personal interest.
- **Engagement**: Demonstrate your full interest and involvement in discussions with students and your judging team by refraining from distractions such as phone usage or side conversations. Your active participation in the judging process is invaluable and much appreciated.
- Do not be alone with students. Work with at least one other Judge if you meet with teams in a private space.

To prepare for the event, Judges should:

- Review this Judges Guide, including the attached Design Award Rubric.
- Review the VEX IQ Challenge Game Video, Game Description and/or the Game Manual at: roboticseducation.org/competition-teams/vex-iq-challenge/:
    - Knowing the tasks that teams will be trying to complete is essential to evaluating their robots on a technical level.
- Review the event location, schedule, team list, and awards to be offered on the event posting at robotevents.com.
- Plan to wear comfortable closed-toed shoes and business casual clothing that is team-neutral.
- Inform the Judge Advisor of any potential conflict of interest. Judges who are associated with a team at the event are not automatically disqualified from judging. However, they should not wear team shirts or other items associated with their teams, they should not interview their own teams, and they should recuse themselves from deliberations involving their teams. Judge Advisors should use the Judge sign in sheet to identify potential conflicts of interest.

During the event, Judges should:

- Review the Engineering Notebooks that were submitted by the teams. Use the attached Design Award Rubric to evaluate the Engineering Notebooks and to guide your discussions with teams.
- For large events that offer one or more Technical Awards or Other Judged Awards, use the VEX IQ Challenge Awards Scoring Sheet to evaluate your discussions with teams.
- Judges for the Design and Technical Awards will meet with teams in their pit areas and observe how they perform on the field. The idea is to avoid "interviews" in a closed room where Judges do not have an opportunity to see the team as it interacts with others during the event.
- If, after several visits to the team's pit area, you are unable to locate the team, leave a "Sorry we missed you" note on their pit table. Your Judge Advisor should have these forms printed.

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- Ask questions that encourage the students to explain their answers using a conversation that shows that you are interested in what they have to say. “How” and “why” questions work well as leading questions. Use the sample questions listed at the end of this document.
- Take notes to support your team evaluations and Judge deliberations. Ensure that your rubric forms and all other judging materials are returned to the Judge Advisor after deliberations.
- Rank each team you have met with for awards consideration after meeting each team. Simply keep your completed rubrics or notes in order of the teams’ rankings. Typically, rankings for the top 25% of the teams that you visited are needed during the deliberation process, but rankings for more teams are sometimes needed for the Design Award.
- Attend and participate in the Opening and Awards Ceremonies, if possible.
- Share all questions or concerns with your Judge Advisor.

During judging deliberations, Judges should:

- Post or share your top-ranked teams for each award, as instructed by the Judge Advisor. Typically, each Judge team will initially post the top five teams for each award or one quarter of the judged teams, whichever is greater. A white board, flip charts or Post-It notes may be used to post the top-ranked team numbers on a wall so that they are visible to all Judges.
- Work collaboratively with other Judges to reach consensus on the award recipients.
- Remember that the deliberation process often includes frank discussions about teams. Therefore, the deliberation process is a confidential process. Judges’ discussions are not to leave the Judges’ Room. Only Judges are allowed in the Judges’ Room.
- Remove yourself from discussions involving teams that present a conflict of interest.
- Share all questions or concerns with your Judge Advisor.
- Return **all rubrics, judging notes, and materials** to the Judge Advisor at the end of deliberations. The Judge Advisor should destroy these materials. **They are not to be returned to teams or Event Partners.**

Judge Training

Your Judge Advisor or Event Partner will arrange for some form of Judge training. This training should include a review of this guide, the current game, and the judging rubrics. This training may take place prior to the event and/or on the morning of the event. Check with your Judge Advisor or Event Partner for details.

Online REC Foundation Judge training materials are available for all Judges, Judge Advisors, and Event Partners. Please visit: roboticseducation.org/volunteers/volunteer-resources/ to find these materials.

If you have specific questions regarding the judging process please send an email to Tarek Shraibati, National Judging Advisor, at: tarek@roboticseducation.org.

Judging Schedule

The entire judging process will take place during the event, with each team of Judges planning to meet with one team every 10-15 minutes. Judges should meet with a wide enough selection of teams to get a good basis for comparison. The Judge Advisor will provide a list of teams that each team of Judges is responsible for visiting, and the match schedules when these become available.

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Additional Awards offered at larger events:

Award	Basic Criteria	Judged	Performance
Robot Skills 2nd Place	2nd place Skills Challenge Team		✓
Robot Skills 3rd Place	3rd place Skills Challenge Team		✓
Inspire	Team that has inspired Judges with their approach to the VEX IQ program	✓	
Sportsmanship	Team that earned the respect and admiration of the volunteers and other teams at the event	✓	
Mentor of the Year	Recognized Volunteer Team Mentor	✓	
Partner of the Year	Recognized Event Sponsor/Supporter	✓	
Teacher of the Year	Recognized Team Teacher	✓	
Inspiration All-Star	Recognized Adult STEM All-Star (given at VEX Worlds)	✓	

The Tournament Manager software supports the creation of both Individual and Team Service Award certificates. These certificates provide great recognition for outstanding teams and volunteers.

Excellence Award

The Excellence Award is the highest award presented in the VEX IQ Challenge Program. This award is presented to a team that exemplifies overall excellence in building a high quality VEX IQ Robotics program. The recipient of this award is a team that demonstrates overall excellence in all components of the VEX IQ Challenge.

Key criteria:

- Design Award ranking
- Teamwork Challenge qualification rounds
- Robot Skills Challenge performance
- All other Judged awards offered at the event
- High quality VEX IQ Robotics program

Events may offer two Excellence Awards in a blended event which includes at least ten (10) teams at both Elementary and Middle School levels. Both teams must meet the criteria established for the Excellence Award.

A team does not have to win the competition to receive the Excellence Award, but must at least be competitive in the Judge's rankings.

Determining the Excellence Award at Events

Judges should start by selecting the top 5 or top 20%, whichever is larger, of the Design Award candidates using the Design Award process and rubrics outlined in this guide. These top teams should be considered the top candidates for the Excellence Award at the event.

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To determine the final Excellence winner at an event, Judges should consider the following for each of these candidates:

- Quality of their Engineering Notebook and design process.
- Their on-field performance (i.e., are they in the top 10 ranked teams in the qualifying matches? and are they in the top 5 or top 20%, whichever is larger, of the teams in skills scores?). Judges should use the ranking reports from Tournament Manager or the VEX Via app.
- The team's dynamics: is the team student-centered and do they exhibit good sportsmanship? Were they considered for other Judged awards?

Deliberations

The final decision on the Excellence Award winner should be qualitative based on what Judges have seen during their interactions with each of the teams and their observations at the event. **Judges will use their best judgment to choose the team they feel best exemplifies the best overall robotics program**. Judges should ask themselves if this team has meet the criteria to be considered an excellent team and does the team exemplify overall excellence. Would Judges want the team to be emulated by other teams?

The Judges' final decision on the Excellence Award should include a team's behavior, sportsmanship, and professionalism at the event. A team is composed of students, mentors, and adults at the competition. Judges may wish to use the "Field Note to Judges" form to help collect information on team sportsmanship. Teams must have an Engineering Notebook to be eligible for the Excellence Award.

There may occasionally be cases where judges should not award the Excellence Award to any team at the event. This may happen when either no teams submit an Engineering Notebook or when the only notebooks submitted are of a very poor quality.

In the case where no notebooks are submitted, there is clearly no team that meets the minimum Excellence requirement of submitting an Engineering Notebook and Judges should not award Excellence at the event.

Judges should recognize that notebooks will improve during the season and that early season notebooks will have less of the iterative design process included. However, even early in the season, notebooks should include documentation of the robot at its current state in the design process. Evidence of a team's identifying the current challenge, brainstorming possible solutions and selection of an approach should be included. These three activities correlate to having addressed the first three criteria of the VEX IQ Engineering Design Notebook Rubric. If no notebooks at the event meet these criteria then the Excellence Award should not be given.

The idea here is to avoid recognizing a team as Excellent and worthy of emulation by all other teams at the event when no team has yet achieved this level. Judges should understand it is not to punish teams but to encourage teams to improve. It is expected that these occasional situations will only arise early in the season before teams have had time to organize themselves. In the event a team of Judges decides not to give out the Excellence Award, they should point out to teams that the VEX IQ Design Rubric and instructions in the front of the VEX IQ Notebook may be used as guides to help them develop their notebooks.

The idea is also to avoid the extreme case where only one or two teams turn in notebooks that consist of only a title page and little else as being recognized as Excellence winners. VEX IQ Judges should remember that students in this program will communicate their ideas differently than older students and that judging of notebooks should consider an age appropriate level of review.

A team does not have to win the VEX IQ Teamwork challenge to receive the Excellence Award, but must at least be competitive in the judge's rankings.

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At VEX Worlds, Excellence Awards will be offered at the Middle School and Elementary School levels. Only teams that have won the Excellence Award at a state/regional/provincial/national championship event and have submitted their Engineering Notebook will be considered for the VEX IQ Excellence Award at VEX Worlds.

Note: If an individual team receives the Excellence Award at VEX Worlds, then the award is given to that team's school or organization, not just the single team. Schools or organizations that won the Excellence Award in the previous three years will not be eligible for the Excellence Award at VEX Worlds.

Design Award

The Design Award recipient demonstrates the ability to implement an effective and efficient robot design process. Their Engineering Notebook and discussion with the Judges will demonstrate the team's ability to produce a quality robot with minimal adult assistance. Only teams that submit Engineering Notebooks are eligible for the Design Award.

Key criteria:

- Engineering Notebook is clear, complete, and organized document of the robot design process.
- Team demonstrates effective management of skills, time, and material resources.
- Students understand and explain how they developed an effective game strategy and robot design.
- Students demonstrate teamwork and effective communication skills.

Design Award Rubric

Judges will use the Design Award Rubric to evaluate the teams' performance on the award criteria. Judging should be broken down to a two-step process. The first step identifies top contenders for the award and the second step determines the award winner. Using this process, it is not necessary for Judges to interview every team that submits an Engineering Notebook.

The first step is to collect all team notebooks during team check in. Judges should then use the first page of the Design Award Rubric to evaluate the quality of a team's Engineering Notebook. Notebooks should be separated into several categories based on this evaluation. The categories may include beginning, intermediate and outstanding. This process allows Judges to identify teams that should be considered for follow up pit interviews using the second page of the rubric. The intent of this process is to allow Judges to identify top contenders for the Design Award efficiently. It allows Judges to identify the top 5 or 20% of teams (whichever is larger) as contenders for the Design Award based on their notebook.

The second step of the Design Award judging process is to use the second page of the rubric to evaluate the students' understanding and application of an effective robot design process, as demonstrated in a team pit interview with Judges. The Design Award Rubric is found below. Rubrics are confidential judging documents and should not be returned to the team, coach, or Event Partner. Rubrics should be destroyed immediately after the Judge Advisor has recorded the winning team.

Engineering Notebook

One of the primary missions of the VEX IQ Challenge is to help students acquire real world life skills that will benefit them in their academic and professional future. The Engineering Notebook is a way for teams to document how the VEX IQ Challenge experience has helped them to better understand the engineering design process while also practicing a variety of critical life skills including project management, time management, brainstorming, and teamwork. Bound notebooks are preferred by Judges. Teams receive a bound Engineering Notebook when they register. Instructions and examples are included in the front of the notebook.

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The Engineering Notebook is created through a concerted effort by a team to document their design decisions. Large events may send a Design Award winner to a state or regional championship, so teams should start their notebooks early and update them often.

Engineering is an iterative process whereby students recognize and define a problem, brainstorm and work through various stages of the design process, test their designs, continue to improve their designs, and continue the process until a solution has been identified. During this process, students will come across obstacles, encounter instances of success and failure, and learn many lessons. It is this iterative process that students should document in their Engineering Notebook.

The Engineering Notebook is an opportunity to document everything a team does throughout the design process. Students should include a number of items in their Engineering Notebook including:

- Team meeting notes as they relate to the design process
- Design concepts, sketches, and pictures
- Notes from competitions regarding observations that should be considered in the next iteration of their design
- Team members' observations and thoughts on their design
- Team organization practices as they relate to their design process
- Programming improvements or major modifications
- Any other documentation that a team finds useful as related to their robot's design

The team should also document their project management practices including their use of personnel, financial, and time resources.

A bound quad-ruled notebook is the preferred format. Teams are provided a notebook by the REC Foundation or may purchase their own bound notebook. The notebook should never be edited. The team number should be on the cover. Pages should never be removed from the Notebook even if they contain errors. The notebook should be written in ink with errors crossed out using a single line. Pages should be numbered, and entries should be dated in chronological order with each page signed or initialed by the students. Additional materials such as computer code or CAD drawings should be glued or taped into the notebook.

Judges will not accept electronic notebooks on lap tops, thumb drives, or cloud-based servers.

Design Award at VEX Worlds

Teams must have been awarded the Design or Excellence Award at a state/regional/provincial/national championship event to be eligible to be considered for the Design Award at VEX Worlds. Eligible teams will be asked to submit their Engineering Notebooks at check in. Teams with high quality Engineering Notebooks will be selected for Design Award interviews in the Team Pit Areas. Teams are not given scheduled sit-down interviews for the Design Award at VEX Worlds.

STEM Research Project Award

The **STEM (Science, Technology, Engineering, and Mathematics) Research Project Award** is presented to the team that shares the most effective STEM Research Project video presentation. This video presentation effectively demonstrates the students' significant depth of understanding of their topic and research findings. The video will also highlight the students' work in sharing what they learned in an effective format. Please note that the STEM Research Project is an optional award at local events; please check with your Judge Advisor or Event Partner to see if it is offered at your event. All events are expected to use the video format for the entire STEM research project judging process.

Teams research a topic of their choice that is related to the STEM theme for the season and share their findings with Judges in a four (4) minute video presentation. Judges use the rubric found in this guide to evaluate the team's video presentation. For more details on the STEM Research Project, please visit: roboticseducation.org/competition-teams/vex-iq-challenge/.

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Design Award Rubric

Team Name: _____ Team Number: _____ ☐ Elementary ☐ Middle Judges: _____

For Design Award details, review the Awards Appendix on www.roboticseducation.org/vex-iq-challeng/viq-current-game/

Directions: Mark the descriptor that best describes the team's performance for each criterion.

The Engineering Notebook…

	Criteria	Expert *(3 points)*	Proficient *(2 points)*	Emerging *(1 point)*	Points
Clear Document of Robotic Design Process	Identify the challenge(s)	Describes the challenge at the start of each design process iteration with words and pictures, and states the teams' goals for accomplishing that challenge	Identifies the challenge at the start of each design cycle	Does not identify the challenge at the start each design cycle	
	Brainstorm solutions	Lists 3 or more possible approaches to the challenge with labeled diagrams	Lists 1-2 possible approaches to the challenge.	Does not list the results of the brainstorming sessions.	
	Select the best approach and plan	Explains why the selected approach was chosen and why the other alternatives were not chosen. Fully describes the plan	Explains why the selected approach was chosen. Mentions the plan	Does not explain why the selected approach was chosen	
	Build, Program and Test	Records the building, programming and test processes and the test results in such detail that someone outside the team could recreate the robot by following the steps in the notebook	Documents the key steps to build, program and test the robot and the key test results	Leaves out important information about building, programming & testing the robot	
Repeat process steps, if needed		Contains a complete history of the design process iterations for the season that resulted in the current robot design, repeating the steps above for each iteration	Describes most of the design process iterations, including most of the steps for each iteration	Leaves out most of the design process iterations	
Complete and organized document of Robot Design Process		Contains Project and Team Assignments, Entries from team meetings, with goals, decisions and accomplishments, and recorders' names or initials and dates. Indexed so that anyone can easily locate any needed information	Contains most of the information listed at left. Organized so that team members can locate most needed information	Leaves out important information and/or is poorly organized	

Describe the best features of this **Engineering Notebook**:

Total Points

Total the number of points earned from Notebook
(Add 3 pts for a bound notebook & enter the number on page 2 of this rubric):

Rubrics are confidential judging documents and are not to be returned to the team, coach, or Event Partner, Rubrics should be destroyed immediately after the Judge Advisor has recorded the winning team.

Design Award Rubric

Robot Design Interview

Criteria	Expert *(3 points)*	Proficient *(2 points)*	Emerging *(1 point)*	Points
Engineering Notebook is a clear, complete, and organized document of the robot design process	Students can explain clearly the robot design process and how they documented their use of the process in their Engineering Notebook	Students can explain most aspects of the design process and how they documented their use of the process	Students can explain only limited aspects of the design process and/or how they documented their use of the process	
Team demonstrates effective management of skills, time, and material resources	Students can explain how team progress was tracked against an overall project timeline and how students were assigned to tasks based on their skills and availability	Students can explain how team progress was monitored and how students were assigned to tasks	Students cannot explain how team progress was monitored and/or how students were assigned to tasks	
Students understand and explain how they developed an effective game strategy and robot design	Students can describe multiple game strategies and robot designs that were considered, and they can fully explain how and why the current game strategy and robot design were selected	Students can describe at least two strategies and designs that were considered, and can explain how or why the current strategy or design were selected	Students can only describe the current strategy and design, or they cannot explain how and why the current strategy or design were selected	
Students demonstrate teamwork and effective communication skills	Students demonstrate high level of teamwork, fluency, and courtesy	Students demonstrate some teamwork, fluency, and courtesy	Students demonstrate limited teamwork, fluency, and courtesy	
Describe the best features of this **Robot Design Interview**:		**Total the number of points earned from Student Interview and Discussion:** **Total the number of points earned from Notebook:** *(including bonus for bound notebook)* **Total the number of points combined:**		

Rubrics are confidential judging documents and are not to be returned to the team, coach, or Event Partner, Rubrics should be destroyed immediately after the Judge Advisor has recorded the winning team.