

VEX IQ Challenge & VRC Judging

Tarek Shraibati

tarek@roboticseducation.org



The VEX IQ Design Award

VEX IQ description:

- The **Design Award** recipient demonstrates the ability to implement the most 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 a 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.



The VRC Design Award

VRC description:

- The **Design Award** is presented to a team that demonstrates an organized and professional approach to the design process, project and time management and team organization. Only teams that submit Engineering Notebooks are eligible for the Design Award.
- Key criteria:
 - Engineering Notebook is a clear, complete document of the team's design process
 - Team is able to explain their design and strategy throughout the season
 - Team demonstrates personnel, time and resource management throughout the season
 - Teamwork, interview quality, and team professionalism



The Design Notebook

The Robotics Engineering Notebook provided by the REC Foundation with team registration include hints on good notebook practices and examples of good practices.

- Bound quad-ruled notebook is best.
- The notebook should never be edited.
- The team number should be on the cover.
- 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.
- Pages should never be removed from the Notebook even if they contain errors.



The Design Notebook

Judges will not accept Electronic notebooks on lap tops, thumb drives, or cloud based servers

- Will accept hard copy print outs in 3 ring binders
- Multiple bound notebooks in a binder count as bound.

Journals vs Engineering Notebooks



Process

Five steps at local regional events:

- Collect Engineering Notebooks
- Quick preliminary review of notebooks
- Review using the Design Rubric
- Interview top teams using the Design Rubric
- Final deliberation



Collect team notebooks

- EP should arrange to collect all notebooks during the team check in process
- Notebooks taken to judges room for evaluation
- Record team numbers of all teams submitting notebooks (for Excellence Award)



Preliminary Notebook Evaluation

- Judges should look at all submitted notebooks and very quickly place them into one of two categories.
- Emerging programs
 - These are very rudimentary notebooks that may consist of just a few pages and which are typically not going to be contenders for the Design Award
 - This team would score mostly 1's on the design rubric for their notebook
 - However, if only one team submits a notebook at an event they are still eligible for excellence even if they are emerging
- Proficient to Expert
 - These are more advanced notebooks that appear to be contenders for the design award
 - This team would score 2's and 3's on the design Award rubric for their notebook



The Design Notebook Rubric

- Once the initial quick inspection of notebooks is completed use the Design Award Rubric to evaluate the Proficient to Expert notebooks.
- Score all Proficient to Expert notebooks.
- Score emerging notebooks with the rubric if time permits.
- Identify top contenders for follow up team interviews.





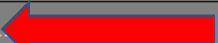
Design Award Rubric



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

For Design Award details, review the Awards Appendix on www.roboticseducation.org/vex-iq-challenge/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 Robot 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 and 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		
Team demonstrates effective management of skills, time, and material resources	Includes an overall project timeline against which progress is checked regularly as well as daily goals and accomplishments. Documents the assignments of each team member based on skills and availability.	Documents most daily goals and accomplishments and most team member assignments	Does not document the team's management of key resources		
Describe the best features of this Engineering Notebook :				Total Points	
<hr/> <p style="text-align: center;">Total the number of points earned from Notebook (Add 3 pts for a bound notebook & enter the number on page 2 of this rubric):</p>					



Design Award Rubric

Page 1 of 2

Team # _____
Judges _____



Directions: Mark the descriptor that best describes the team's performance for each criterion. Write the best features of the team's Engineering Notebook and Student Interview and Discussion on the back of this page.

Engineering Notebook: The notebook... Page		See Student Interview and Discussion Criteria on Next Page		
Criteria	Expert (3 points)	Proficient (2 points)	Emerging (1 point)	Points
Design Process: Challenge	Describes the challenge at the beginning of the notebook with words and pictures and states the teams' goals toward accomplishing that challenge.	Identifies the challenge at the beginning of the notebook.	Neglects to clearly identify the challenge.	
Design Process: Brainstorming	Generates an extensive list of possible approaches to the challenge with labeled diagrams.	Provides an extensive list of possible approaches to the challenge.	Contains a very short list or does not list the results of the brainstorming sessions.	
Design Process: Select Approach	Explains why the selected approach was chosen and why the other alternatives were not chosen.	Explains why the selected approach was chosen.	Does not document why the team selected the approach they did.	
Design Process: Build & Program	Records the building and programming process in such detail that someone outside the team could recreate the robot by following the steps in the notebook.	Documents the key steps in the process of building and programming.	Seems to skip some important steps in the process of building and programming the robot.	
Test & Redesign	Describes in great detail the process of troubleshooting, testing, and redesigning through all iterations (cycles) of the process.	Captures the key results of the troubleshooting, testing, and redesign cycle.	Leaves out important information about the troubleshooting, testing and redesign cycle.	
Usefulness	Is such a detailed account of the team's design process that the reader could recreate the project's history. It is a useful engineering tool. It contains evidence that team made decisions about design process based on previous entries. The team can explain why the notebook is organized the way it is.	Is a complete record of the process, documenting the key events of each work session. It is organized in a way that any team member can locate needed information.	Is missing, or lacks the detail needed for the reader to understand the team's history, and/or is not organized in a way that an outsider can make sense of it.	
Resources	Shows the team's efficient use of time with an overall project timeline. The team uses checkpoints to help them know how well they are staying on schedule and readjusts their schedule as needed. The notebook illustrates the good use of human resources by assigning members roles based on their strengths.	Documents the team's efficient use of time with planning and goal-setting for each day's session. It shows that the team used its human resources wisely by assigning members specific tasks.	Does not provide evidence of the team's wise use of the team's time or talents.	
Teamwork	Provides evidence that all team members were consistently involved in the process, that individual team members were self-directed enough to finish what needed to be done, and that all team members consistently shared ideas and respectfully considered each other's input.	Shows that all team members' were involved in the process, that members could be counted on because they did what they were supposed to, and that the whole team shared ideas and supported ideas of others.	Suggests that perhaps some team members did most or all the work, that one or more individuals had to be nagged or reminded to do their work, and/or that some team members did not contribute ideas or that their ideas were not considered.	
Total the number of points earned from Notebook (Add 3 pts for a bound notebook & enter the number on page 2 of this rubric):				

Interviewing teams

- Judges will conduct follow up interviews with the top contenders
- Judges should use the Student Interview portion of the Design Rubric to evaluate selected teams in their pit area
- Place final 3-5 best teams based on rubric onto the list as a finalist for the Design Award



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:		

Team # _____

Judges _____



**Student Interview and Discussion: During the interview...
Page**

See Engineering Notebook Criteria on Previous Page

Criteria	Expert (3 points)	Proficient (2 points)	Emerging (1 point)	Points
Design Process	Students describe the goals of the design process and how the team accomplished the challenge.	Students provide possible goals of the design process but do not clearly identify how team accomplished the challenge.	Students neglect to identify any goals of the design process and cannot describe how the team accomplishes the challenge.	
Design: Methods & Strategies	Students describe multiple design methods and strategies considered; explaining both how and why the current design strategy was selected	Students only describe their current design methods and strategy; explaining only one of either how or why the current design strategy was selected	Students do not describe any of the design methods or strategies considered; do not explain why or how the current design strategy was selected	
Team Work: Contributions	Students explain how each team member contributed to the design and strategy.	Students explain how some team members contributed to the design and strategy.	Students only explain how 1-2 members contributed to the design and strategy.	
Interview: Individual Contributions	All students independently answer the Judges' questions.	Students support each other as needed to answer the Judges' questions.	Students rely on one or two members to answer all the questions.	
Interview: Professionalism	Students present their answers in a respectful and courteous manner to the Judges and other team members, making sure each team member has a chance to contribute and waiting to speak until the other person has finished.	Students present their answers in a respectful and courteous manner to either the team members or the Judges.	Students do not present themselves in a respectful and courteous manner.	
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:				

The REC Foundation thanks Northeastern State University, Oklahoma teacher training program for developing this rubric.

Comments: _____

Final Deliberation

- Rubrics are quantitative in nature.
 - The rubrics are intended to be used by judges to narrow down the field of contenders for each award.
- Judges are expected to apply their qualitative judgement when making a final decision on all awards.
 - Multiple teams often score “perfect” 3’s on a rubric or fall within a couple of points of one another.
- 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.
 - Teams with a perfect rubric score often do not understand why they were not selected for an award.
 - Judges should also be aware that they must be very careful in discussing these awards with teams after an event. A judge’s best intentions are often misinterpreted by teams resulting in students with hurt feelings.
- The Judge Advisor must properly dispose of these and all other judging materials at the conclusion of the event.
 - Teams will “dumpster dive”



Design Award at VEX Worlds

- Teams must have been awarded the Design or Excellence at state/regional/provincial/national championship event to be eligible for Design at VEX Worlds.
- Eligible teams will be notified in advance 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.

