TSA VEX Robotics Competition (VRC)

OVERVIEW

The VEX Robotics Competition (VRC), presented by the Robotics Education & Competition Foundation (REC), is the largest and fastest growing high school and middle school robotics programs globally, with more than 10,000 teams from 32 countries playing in over 750 tournaments worldwide during the 2014–2015 season. Each year, an exciting engineering challenge is presented in the form of a game. TSA VEX teams - with guidance from their teachers and mentors - build innovative robots and may compete year-round in a variety of matches, including state and national TSA VEX competitions.

CHALLENGE

Participants design and build a robot using the engineering design process that will best address the challenge of the designated VEX game design for the VEX Robotics Competition (VRC). In the TSA VEX Robotics Competition (TSA VRC), **teams compete head-to-head, one robot versus one robot; there are no team alliances.**

The robot should be structurally efficient, capable of scoring in both robot and programming modes of operation, and demonstrate real-time competition in head-to-head elimination tournament matches.

2016 – ***The VRC game is Nothing But Net***

ELIGIBILITY

In addition to annual TSA affiliation, TSA VEX teams must be registered on www.robotevents.com in order to compete at TSA VEX events.

Participants are limited to two (3) teams per chapter, with a minimum of two (2) and a maximum of six (6) participants per team.

Both middle school and high school teams may compete in the VRC event; there is no separate VRC division for middle school teams.

TIME LIMITS

A. Entries must be started and completed during the current school year.

PROCEDURE

A. TSA event registration: TSA state advisors approve of and submit teams for the national TSA VEX Championship event based on advancement guidelines. Additional teams may be waitlisted by notifying TSA.

B. RobotEvents.com registration: The REC Foundation verifies teams submitted by TSA state advisors and adds teams to the national TSA event listed on www.robotevents.com.

C. Check-in: Participants check in their entries (robots) at the time and place stated in the TSA conference program.

D. Inspection: Robots are inspected using official VRC inspection sheets. Students are present for the robot inspection. Robots must pass inspection in order to be eligible for competition. Repairs and adjustments may be made, as required, in order for robots to pass inspection. Inspection must be completed within the designated timeframe and before a team competes in any component of the competition. Re-inspection of a robot may be ordered at any time throughout the competition by a referee to verify that a robot meets inspection requirements.

E. Skills Challenge: Including both Robot Skills and Programming Skills, this part of the competition determines the team rank for advancement to the Head-to-Head Tournament. Each team should complete at least one, but no more than three, of each skills challenge. The best score from each skills challenge will be used to rank teams. The combined skills ranking will be posted, in order, by rank.

F. Design Award: All teams are eligible to interview for the Design Award. A minimum of two (2) representatives from each team will report to the interview event area at the time and place stated in the conference program. Teams are given the opportunity to sign up for available interview time slots. Teams must bring their engineering notebook to the interview and be prepared to respond to questions, as well as explain their iterative design process to judges. Team conduct throughout the event is a factor in the Design Award.

G. Head-to-Head Tournament: Teams will be matched according to their combined rank from the skills challenges and assigned slots in the head-to head tournament, which is an elimination tournament. A combination of single and double elimination matches may be held in order to determine a tournament champion.

H. Excellence Award: Judges review the results from the Robot Skills Challenge, Programming Skills Challenge, Head-to-Head Tournament, and Design Award to determine the best overall VEX Robotics team. Team conduct throughout the event is a factor in the Excellence Award.

REGULATIONS

A. Teams must be affiliated with TSA and with the REC Foundation at www.robotevents.com.
B. Teams must be approved by their TSA state advisor and the REC Foundation to advance to the national level event.
C. Team members must wear TSA Competition Attire.
D. Robots must pass official VEX Robotics Competition inspection before competing.
E. Safety glasses are required during skills challenges and the Head-to-Head tournament for VRC.
F. Notebooks are returned to student teams at the end of the Design Award Interviews.
G. The entry (the robot and notebook) must be the sole work of the members of a team. At TSA VRC events, students showcase their knowledge and skills in designing, building, repairing, and programming a robot, and in documenting their learning in an engineering notebook.
H. The engineering notebook is a requirement to be considered for both the Design Award and Excellence Award.
I. Referee rulings are final. Teams are responsible for confirming scored matches before a field is reset. Only team drivers may share their questions or concerns with a referee. Recordings on phones or other electronic devices will not be reviewed to challenge a score.
J. Students are expected to showcase good sportsmanship and conduct themselves in a respectful manner. Failure to do so may result in disqualification.

EVALUATION

Four evaluation components contribute to the determination of the Excellence Award.

Robot Skills Challenge – a one minute (60 seconds) challenge in which a team operates its robot in the competition field using driver skills and controller(s), with the opportunity to score as many points as possible unopposed by any other robot. Each team has up to three attempts. The highest score is used to determine ranking.

Programming Skills Challenge – a one minute (60 seconds) challenge where a team operates its robot in autonomous mode in the competition field using programming skills, with the opportunity to score as many points as possible unopposed by any other robot. Each team has up to three attempts. The highest score is used to determine ranking.

Head-to-Head Tournament – Teams compete head-to-head, one robot versus one robot; there are no alliances. Single elimination matches involve one match, with the winning team advancing to the next round and the losing team eliminated from tournament play. Double elimination matches are the best of three matches. The first team to win two matches advances to the next round. The first team to lose two matches is eliminated from tournament play. Elimination matches continue until a tournament champion is determined.

Design Award – Teams interview and present their engineering notebook to judges for evaluation. Team sportsmanship and conduct throughout the event are factors for this award.

Excellence Award – This award goes to the top robotics team once all competition and judged award criteria are evaluated. Team sportsmanship and conduct throughout the event are factors for this awards.

VEX Awards Scoring Sheet

Division

Judge

Names

Remember to look for Judge's Award Candidates! The Judges' Award goes to a team the judges decide is deserving of special recognition. Judges consider a number of possible criteria for this award, such as team displays of special attributes, exemplary effort and perseverance at the event, and team accomplishments or endeavours throughout the season that may not fall under existing awards - but are nonetheless deserving of special recognition.

Enter Scores in columns at right from 0 to 10, with 10 being highest.	Courteous, helpful & respectful to all, on & off the field	Treats others on field in spirit of friendly competition	Demonstrates respect & willingness to help all	Engineering Notebook is a clear, complete document of the team's design process	Team explains their design & strategy during season	Demonstrates personnel, time & resource management	Team work in interview	
Team #	**Sportsmanship**			**Design**			**All**	**Notes and Comments for Award Script (continue on other side)**

Design Award Rubric

Team # _____

Judges _____

For Design Award details, review the Awards Appendix on http://www.roboticseducation.org/vex-robotics-competitionvrc/game-day-running-an-event/

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...			**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 and 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 and 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 the team made decisions about the 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 team members could be counted on because they did what they were supposed to, and that the whole team shared ideas and supported the 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.	

Design Award Rubric

Team # _____

Judges _____

Student Interview and Discussion: During the interview...			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:	
			Total the number of points combined:	

Comments: