Main Event: Search & Rescue

Event Description:

Prior to the day of the event, teams of 2-3 students will create a robot that can navigate a blind maze using a live video feed and then find 3 randomly placed objects, remove them from the maze, and drop them into the safety target zone. Students' robots must be made from VEX IQ pieces. Students may use rubber bands or tape to modify their claw for more grip.

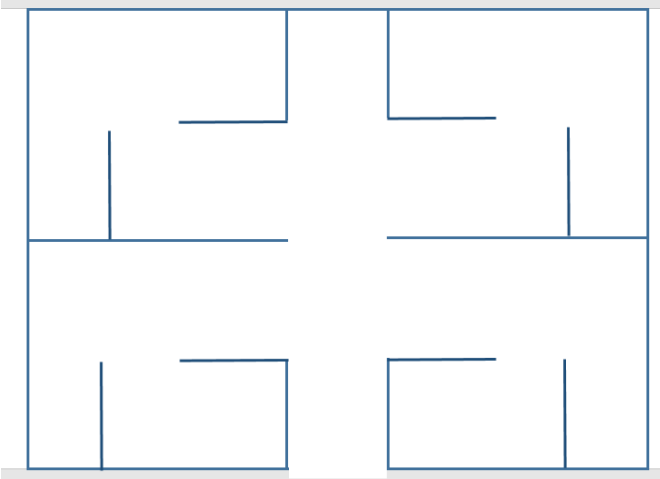
Common Core Standards and 4C's:

Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own ideas clearly and persuasively. Creativity, Collaboration, Communication and Critical Thinking.

Designing and Programming your Robot:

Design Specifications:

Your robot will need to be able to drive around on a course and attempt to pick up and carry 3D printed figurines from their elevated base (3 5/8" tall) to the outside of the maze where it will drop it onto a flat target zone. The figurines will vary in size: small, medium, and large.



Course Layout:

The course has one entrance which is also the exit. It is modeled after a small dwelling, with a central hallway that leads to two rooms on either side of the hallway (4 rooms total).

Each room will have extra walls/barriers. Each room layout is a rotation and reflection of a previous room.

The course itself will take up a space of 8ft by 8ft and will be curtained off. The walls of the maze will be 8" tall, and the paths/aisles will all have a minimum of 1.5' in width. There will be a gate at the entrance, measuring 8" high. The robot must be able to drive under the gate.

Technical Requirements:

Vehicles must be constructed entirely with VEX IQ pieces from the district purchased sets.

The Robot's height cannot be more than 8 in. But, keep in mind the aisles have a width of 18 in.

The robots may be controlled with a remote control

Your robot will need a way **to stream live video feed**. This can be accomplished with a cell phone, a goPro camera, or another small video recorder. Apps to stream include google hangouts, skype, robocam, and others.

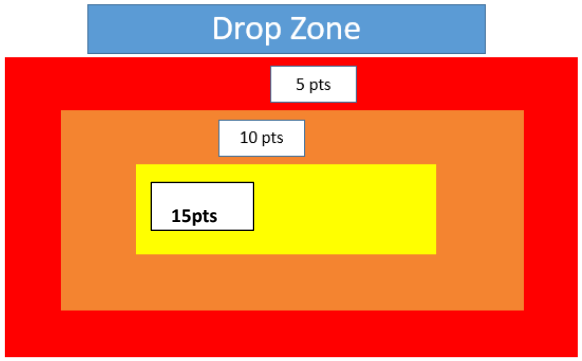
Time will start as soon as the robot crosses the gate and time will stop as soon as it drops the 3rd figure, or 10 minutes have passed.

Teams will have 10 minutes to complete the course. The score and time combination will be used to calculate the FINAL SCORE (see scoring section).

ONLY registered students are allowed to touch the robot and computer that is used. (If a situation such as laptop failure arises, then the coach can inform a contest official and receive approval before entering the team competition area.)

Scoring:

Scores will be a combination of the points awarded from successfully completing the course AND from the time it takes to finish. The majority of the points come from rescuing the figures and dropping them carefully in the target zones. Time will mostly be used to help split ties, along with points from the Design Document.



Rescue Points: Students receive 5 points for each figure they successfully carry out past the gate. If the figure touches the ground at all, carry points are null.

Drop points: Students receive up to 15 points based on where on the target they drop the figure. If any part of the figure is on a higher scoring color, we will take the higher score. Students may also push the figure into a better color.

Maximum Points: Each figure can earn a maximum of 20 points: +5 for carry, and +15 for red drop.

Locking Scores: When two of the robot's wheels leave the target zone, the score is to be recorded, and the figure moved to the scoring bins.

Points from Course:

Objective	**Max Points**
Rescuing large Figure	20 pts
Rescuing medium figure	20 pts
Rescuing small figure	20 pts
Total	60 pts

Points from Time:

Up to 10 points will be awarded based off of your time as a ratio to the best time of all competitors. The time used will be from whichever round you scored the most points from the course.

VEX IQ Robotics Scoring Breakdown		
	Max Points	Formula
Points from COURSE	60	See List Above
Points from TIME	10	First Place Time / Team's recorded time x 10 = Team's TOTAL TIME
Points from Design Document	30	See Next Page
TOTAL POINTS	100	