Robotics Contest

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The Wyoming 4-H Robot Contest robotics contest is modeled after the National Robotics Challenge which began as the Society of Manufacturing Engineers Robotic Technology and Engineering Challenge in 1986. The contests used have been modified to fit the needs and capabilities of Wyoming 4-H project members and the contest is open to any 4-H member currently enrolled in the Robotics project. Wyoming 4-H is in agreement with the mission statement of the National Robotics Challenge – "to provide educational robotics competitions where students can develop the creativity, engineering, problem solving and leadership skills they will need in the world of tomorrow."

A brief description of each segment of the contest follows. Complete rules for each contest can be found on subsequent pages. Please note that youth entering more than one contest will begin with the construction contest so that robot does not have to be altered until they have competed. Based upon entries, a schedule will be created and emailed out to all participants providing email addressed during registration and to the county 4-H educators. Youth will be expected to be ready to compete during their scheduled time. Members will be allowed no more than 5 minutes to make robot changes between contests.

Robot Construction (Junior, Intermediate, Senior): Members will select a task that relates to the current year's theme (see Robot Construction Contest rules for more information) for their robot to perform and then design, build and demonstrate that the robot can perform the selected task. All design and programming work must be done prior to the contest and member must come prepared to demonstrate their robot performing the task for the judges. Members must bring all materials and props for their demonstration with them and be able to set up and demonstrate the action of their robot within 5 minutes.

Mini-Sumo Robot: (Junior, Intermediate, Senior) The member will design and build a self-propelled or sensing robot designed to force another robot outside a circle four (4) feet in diameter. This contest will be divided by age divisions (junior, intermediate and senior) with a double elimination bracket configuration.

Mission Challenge (Junior, Intermediate, Senior)- Participants will be given from three to six missions or tasks to perform with their robot. Specific tasks will be outlined at the contest and may include things such as moving objects from one place to another, navigating and obstacle or using lever type actions. Members may bring an assembled robot, but all programming must be done on site.

Please note: *Members must bring their own robot kit* (preferably the Lego Mindstorms NXT or the EV3) and any additional Lego pieces necessary for their demonstrations. **It is also required that members bring their own laptops/software.**

****For all contests partners or teams are acceptable** as long as each of the youth is entered individually and the team or partners are entered in the age group of the oldest participant. Please note however, that youth participating as partners or teams will receive one award to share as a team.

For ideas and helpful tips/discussions, visit the National Robotics Challenge Yahoo! group for help facilitating communication and assisting participants. The group's page can be found at http://groups.yahoo.com/group/NationalRobotsChallenge

General Competition Information

Age Groups: Junior (8-10)
Intermediate (11-13)
Senior (14 & up)

Requirements: The contests are open to any 4-H member currently enrolled in the Robotics project. Members may enter one or all of the contests.

Judging
All of the contests are ranked based on the criteria in the rules and score sheets. Members are judged on their application of technological principles and concepts and their ability to solve difficult problems. During the judging for each contest, only the contest facilitator and judges/officials are permitted in the designated contest area. Leaders, other members, parents and additional competition attendees are prohibited from entering the designated area of the contest while judging is occurring. For all contests and special awards, the decisions of the judge(s) are final and binding.

Awards:
Awards will be given to each of the three age groups for each of the contests (Robot Construction, Mini-Sumo and Mission Challenge).

Robot Construction Contest

Theme: Space Exploration

In the Robot Construction Contest, members will create a robot that simulates some type of space exploration, either real or imagined. The robot should be designed and built to perform the task that the robot is needed for and demonstrate that the robot can perform the selected task. Tasks and solutions should be well thought out, innovative and creative ideas that provide solutions to real world needs and challenges surrounding space exploration.

Rules

1. The actual robot must be built by the contestant from Lego pieces (i.e. robot needs to be built by member from individual kit components such as Lego Mindstorms NXT or EV3 kit).
2. Commercially available components or specially constructed components are acceptable for use in the building of the robot.
3. The set up and demonstration of the robot's capabilities cannot exceed 5 minutes, with an extra 5 minutes for questions from the judges.
4. The robot and its components must fit and function within an 8’ x 8’ footprint.
5. Scoring is based upon uniqueness of the task, quality of the design, functionality of the task, operation of the robot, workmanship, and the interview with the judge.
6. Members must be prepared to verbally present to the judge(s) the following:
    a. A statement of the purpose or function of the robot (i.e. what task will the robot be doing)
    b. A statement of the process used to design the robot and the troubleshooting involved
    c. A description of how the programming was done
    d. Optional, but not required is a print out of programming for the task the robot performs.
7. Decisions of the judges are final and binding.

Robot Construction Score Sheet

Member Name: _____

Age Group: ____ Junior ____ Intermediate ____ Senior

Judging Criteria	Excellent	Proficient	Emergent	Novice	Points Awarded
Member and project demonstrate thorough Robot solution/task design process (scientific method, technological problem solving process, etc.)	5	4	3	2	
Robot design and programming utilize both simple and complex processes (sensors, attachments, mechanics etc.)	5	4	3	2	
Innovativeness, creativity of task/design	5	4	3	2	
Degree of difficulty of task/solution	5	4	3	2	
Judge Interview: Member demonstrates knowledge of design and programming problem solving and mastery	10	7	4	2	

Total Score:_____

Judge's Comments:

Judge's Signature:_____

Mini-SUMO Robot Contest

The Mini-SUMO Robot Contest requires the member to build an autonomous self-propelled or sensing robot, designed to force another SUMO Robot outside a four (4) foot diameter circle. The competition circle will be a flat black, 4 foot in diameter, surrounded by a two-inch (2") wide (painted or taped) flat, white ring. When one Sumo causes the wheels of the other to fall off the competition surface, that sumo is declared the winner.

Rules

1. The SUMO can use sensing devices to govern the motion of the SUMO and can use sensors to detect the other SUMO and/or the edge of the white circle.
2. Sumos cannot exceed 3 Kilograms in weight.
3. Sumos ***cannot*** exceed a **maximum size** of 20cm x 20cm x 20cm at the start of the contest. They may have attachments however that upon the start of the contest extend beyond the 20x20x20 footprint.
4. The SUMO drive wheels **must** be non-destructive to the playing surface.
5. The SUMO may not have a remote off/on switch.
6. The contest will be run in a double elimination tournament format for each age group.
7. At the beginning of each competition, with the power switch in the "off" position, the SUMO handler(s) will position their SUMO in the head to head position as instructed by the judges. At the command of the judge/facilitator, the handler(s) will turn the power switch to the "on" position.
8. When one SUMO causes **the wheels** of the other SUMO to fall off the competition board surface, that SUMO bot is declared winner of that engagement.
9. If one SUMO is disabled by another, it is automatically eliminated from that round
10. If the SUMO match continues for 3 minutes without a winner, there will be an automatic re-match. If after 3 consecutive re-matches, no winner is determined, both SUMOs will be given 5 minutes to re-program/build for a final match up. If no winner is determined from that re-match, both SUMOs will go into the loser's bracket or be eliminated from the contest.
11. If both SUMOs leave the circle at the same time, a "non-contest" is declared and the two SUMOs are repositioned and the contest begins anew.
12. Decisions of the judges are final and binding.

Mission Challenge

Contest Description: This fun contest is designed to challenge participants to demonstrate their on-site programming and problem solving skills. Participants will design and program their robot to complete the assigned tasks in 30 minutes or less. Scoring will be based on both timing to complete the mission challenge and the accuracy of mission completion.

Rules:

1. Participants may come with a pre-constructed Lego Mindstorms NXT or EV3 robot ready to program.
2. Mission challenges will be described to all participants at the same time by an event official. Mission challenges will not be released until the event so that no advantage is given to any individual.
3. Depending on participant age group, participants can expect from 3-6 mission challenges.
4. Once start time is called, participants may utilize any components (including sensors) that are official Lego parts to navigate and accomplish the missions.
5. Participants will NOT be provided laptop computers and must bring their own.
6. Officials will document the exact start and end time for each participant to complete the mission(s).
7. Time will be called for all participants 30 minutes after start time.
8. There will be an official start line/base area from which the start time will begin.
9. A participant may restart the robot as many times as necessary from the start line, but the timer will not be stopped for them to do so.
10. Participants receive NO MORE than 30 minutes from the start of the contest to the end. If participants are not finished within the 30 minute time period, their score will be based on the extent to which they have completed/solved the assigned missions.
11. Placings will be based on time elapsed to solve the missions or the number of missions completed in the 30 minutes allowed.