Trial/Pilot Event

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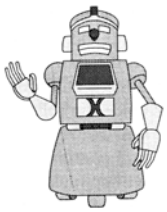
ROBOT RAMBLE

1 **DESCRIPTION**: The object of this event is to design and build a robot capable of performing certain tasks on a prescribed playing field.

A TEAM OF UP TO: 2 **IMPOUND:** Yes **APPROXIMATE TIME**: 5 minutes/Team

2 **MATERIALS**:



a. Each team may enter only one robot that must be built prior to the competition.

b. The robot may be controlled remotely by radio control, infrared, or by a control box with wires leading to the robot. **Batteries used in the controller shall be as stipulated by the manufacturer without modification. Controllers constructed by the competitors shall be powered by a battery not exceeding 9.6 volts.**

c. At the start of the competition the robot, with the exception of the wires that connect to the student control box(es), must be able to fit into a Plexiglas qualifying cube with inside dimensions of 30 cm x 30 cm x 30 cm.

d. **All robot motion must be powered only by** electrical, elastic or gravitational energy. These forms of energy may not be converted to other forms such as hydraulics, pneumatics, and fluidics **to power the robot**.

e. **Each** robot circuit must be energized by one or more commercial batteries which do not exceed 9.6 volts. If multiple batteries are used, they may be connected in series or parallel as long as the voltage output does not exceed 9.6 volts. The voltage stated on commercial batteries will be accepted.

f. Each robot function (such as drive train, arm, etc.) may have its own independent circuit, source of electrical energy, and control mechanism.

g. The robot must have a legible team name on it.

h. Radio control equipment used for this event must operate on frequencies designated by the Federal Communications Commission (FCC) regulations for surface devices (cars, boats, etc.). The frequency must be marked by the manufacturer on the transmitter. Allowable frequencies are: 75 MHz band (75.41 through 75.99 MHz) which contains 30 channels, 27 MHz band (26.995 through 27.255 MHz)**, or** 49 MHz band (49.8302 through 49.890)**. No other frequencies may be used. Robots using other frequencies will not be allowed to compete.**

3 **PLAYING FIELD:** See diagram of the Playing Field

a. The playing field for the event shall be constructed on a piece of smooth, dense, short nap carpet approximately 4 feet by 8 feet.

b. The playing field will be marked on the carpet with a permanent ink-marking pen. Each line on the playing field will be approximately 1/2 inch wide.

c. The playing field will be a rectangle one meter wide by two meters long, divided by a centerline into two one meter square zones. One zone will be Zone A and the other zone will be Zone B. **Students may not step or stand on the marked off playing field**.

d. Zone B will **contain** the starting position for the robot.

e. Zone A will contain all of the scorable items at the start of the competition. An equilateral triangle, 30 cm on each side, will be drawn on the playing field in the approximate center of zone A. The side of the triangle nearest the centerline will be parallel to the centerline of the playing field.

f. All materials for the event, including the playing field, qualifying box, goal box, balloons, **and scorable objects** will be provided by the event supervisor.

g. At the start of the competition, the event supervisor will place the following objects in Zone A: **4 tennis** balls, **3 D-cell batteries,** and **five 3 inch by 5 inch standard index cards**.

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h. **Three D-cell batteries** will be placed **(positive pole up)** on the three corners **(one each)** of the triangle in Zone A.

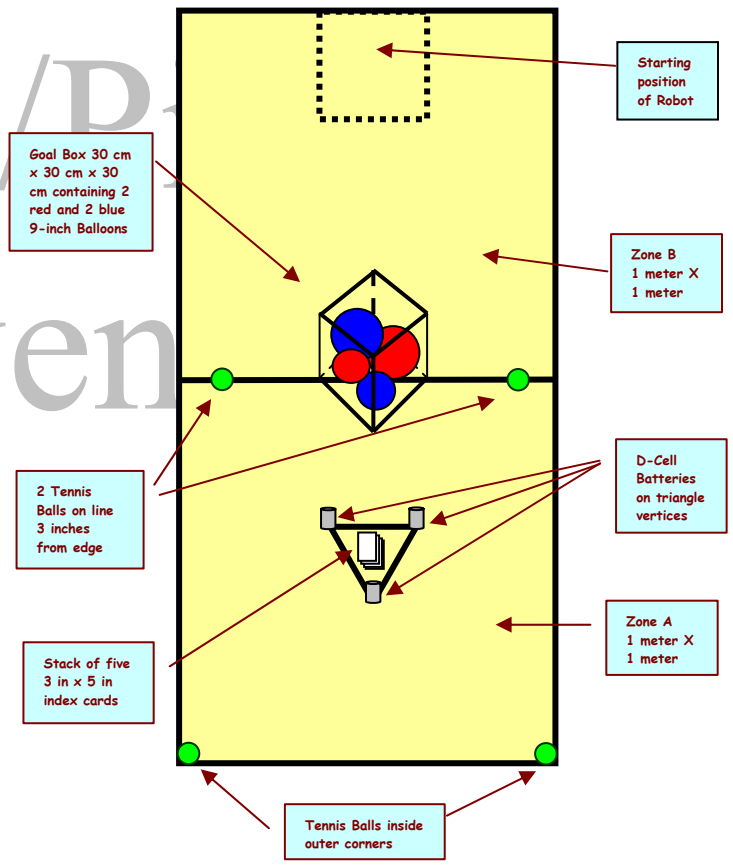
i. **Five** standard **3 inch by 5 inch index cards** will be **stacked** flat on the playing field in the center of the equilateral triangle **with the 3 inch edges parallel to the short edges of the playing field**.

j. Two tennis balls will be placed in the outside corners of Zone A. One will be placed in each corner so that it is just inside the outside line of the playing field.

k. Two **tennis** balls will be placed on the line that divides Zone A from Zone B. **Each** one will be placed **so that their centers are** 3 inches from each end.

l. A goal "box" with inside dimensions of 30 cm x 30 cm x 30 cm, with no bottom or top, will be placed inside of the playing field with an open side up in the middle of the center of the line that divides Zone B and Zone A in a diagonal configuration so that the two opposite corners are both on the center line. The goal box must be made of Plexiglas.

m. The team will inflate and tie off **two** circular 9**-inch** blue balloons. **They may be inflated by the team to any size** and placed in the goal box. They will also place **two** red 9**-inch** balloons **(**inflated or deflated) in the box. The 9**-inch** refers to the manufacturer's recommended maximum inflated diameter of the balloon. All four balloons must **be placed so that they** fit completely within the goal box.



4 **COMPETITION**:

a. All robots and control systems must be impounded before the start of the competition and will be released after the last team has finished competing. Robots and controls entered by teams that have filed an appeal may be retained by the event supervisor until the appeal process is completed.

b. **Before starting** the competition, students will place their robot in the designated starting position inside of the playing field at the center of the end boundary line of Zone B.

c. **The students** will **then** place the qualifying cube over the robot. If the robot does not fit in the cube, the students will be allowed to compete but their robot will be ranked behind all of the other robots that do qualify. After this point, students may not touch their robot **until their run is completed**.

d. The students will then remove the cube. After the qualifying cube is removed, the robot may self-activate a change in size or shape (not start). Changes may not be activated mechanically or electronically by the students until competition begins.

e. The competition will start by having the judge **verify** that **the timer(s) and** the students are ready. **The judge will** then count aloud "1, 2, 3, go". **Teams will be allowed three minutes,** starting with the word "Go", **to complete the** task of moving **the scorable items into scoring areas.**

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f. The competition will stop (and the score will be determined at that point) when any of the following occur:

i. Three minutes have elapsed from the word "Go".
ii. The team says "Stop".
iii. Any part of the goal box is "out of bounds".
iv. The team touches the robot.
v. The robot is physically moved by the wires connecting it to a control box.
vi. A team member steps on the playing field after the team has received a warning.

g. The robot may move the goal, but **the goal** must remain inside the playing field **in any zone**.

h. If a scorable item is moved by the control wires, it will be out of play and may not be used to attain any points.

i. The students will receive a warning if they step on the playing field. **A second step onto the playing field ends the competition and their score will be** based on the locations of the scoreable objects at the time the second violation occurred.

j. Miscellaneous robot parts, or the entire robot, may end up in the goal box without penalty.

k. **At the end of the competition, the goal box must be completely in bounds and resting directly on the playing field with the goal box walls perpendicular to the field. If these conditions are not met, scorable objects will NOT be considered to be in the goal box.**

l. At the end of the competition, **all controllers must be set on the floor immediately, and** the event supervisor will allow 10 seconds for the robot to "come to rest" with the power off to determine if any parts are touching the ground outside of the playing field.

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5 SCORING:

a. At the end of **the competition**, points will be awarded based on the number and types of items that were moved **into scoring areas**.

b. If the robot (parts touching the ground) is completely in Zone A or the Goal Box at the end of the competition, the team will receive 15 points.

c. A team will receive the following points for each **of the listed** items **moved into the following areas**:

Item	Number	Points in Zone B	Points in Goal Box	Maximum Points
Index Cards	**5**	**5**	**15**	**75**
Tennis balls	**4**	**10**	**25**	**100**
D-cell batteries	**3**	**15**	**35**	**105**

Note: Points may be earned for only one location.

i. A scorable item that **touches the floor outside** of the playing field at any time, even if it is under the control of the robot, is out of play and may not be used to attain points.

ii. The robot or any scorable item on the line or straddling 2 zones will receive the lesser score.

iii. If any part of the goal is out of bounds, the scoreable items within will have no point value.

d. The team will receive 20 points for each blue balloon that **is** deflated by the robot **and that completely stays** in the goal box (40 possible points).

e. **T**he team will receive 40 points **for each red balloon that is completely removed from the goal box (80 possible points)**. NOTE: If any part of **either** red balloon remains in the goal box, the team will **not** receive **the points for that balloon.**

f. Maximum score is **415**.

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g. The team with the most points will be the winner. In the case of a tie, the team that completed the task in the shortest length of time will receive the more favorable score value. If teams still have identical scores, the tie will be broken by massing the robot (which includes robot and batteries). The robot and its batteries with the least mass will receive the more favorable score value (ranking).
h. Robots that fail to meet any of the specifications under "Materials" will be allowed to compete but will be ranked behind those that **meet specifications**. Robots that violate the FCC regulations will not be allowed to compete and will receive participation point(s) only.

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Event

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