2017 Illinois 4-H Robotics Challenge – Health Bot

Description and rules:

This year’s theme is inspired by Healthy Living and tasks that teams’ robots will perform will be related to healthy choices. For more information on healthy living, check out the Centers for Disease Control website at https://www.cdc.gov/healthyliving/.

Teams must consist of at least three youth with a maximum of ten youth aged 8-18. To Participate youth MUST BE AN ENROLLED MEMBER OF 4-H PRIOR TO THE EVENT.

Any commercially available or homemade robot may be used and any material may be used in the construction of the robot and field. This is also your opportunity to be creative in designing your field and robot.

The playing field is a standard FIRST® LEGO® League (FLL®) table constructed using a 4’x8’ sheet of plywood with 2x4 walls, resulting in a 45” x 93” playing surface. Alternatively, teams can practice and design without a table, however at the competition event, robots must be able to run on a field with walls. It is suggested that teams that are practicing without a table use boxes, 2x4s or a wall to simulate the competition table walls to be sure robots stay within the bounds of the field. A playing area can be made on a floor using two 2x4s 96” long and two pieces 43” long - basically a table without the plywood.

All robots must start out touching one of the four table walls. This year, teams can have a maximum of two robots running simultaneously, however only one robot may be scoring points at a time. Robots must be separated by at least 4’ at the start of the event.

The only stipulation is that the robots have to communicate via bluetooth or sensors. The idea is that you would press the start button on both robots, but one of them would wait for a command from the primary robot before moving. The command could be bluetooth or it could be as simple as the "waiting" robot using an ultrasonic sensor to detect the main robot driving past, etc.
The robots will have 3 minutes to complete their programmed tasks. Once the robot(s) and timer have started, human team members cannot touch any robots or anything on the field. Depending on time available, teams may have one or two practice runs at the table before the “real” run. No remote control will be allowed.

Before the first table run, teams’ fields will be inspected by the judges. Any field element that does not meet the specifications will cause the team to incur a technical penalty. Teams will be given a “pass / fail” card which will be used by the judges to record the penalties. If teams can modify their field to pass inspection, then they will receive a “pass” card.

All event models must be separate and distinct. For example, vaccine and library missions cannot be combined; each has to be performed separately.

Teams will incur a technical penalty each time they contact the robot or directly influence its path. Each technical penalty removes 10% of a team’s score, with a maximum of 5 penalties.

*While you may use 2 robots to complete many of the tasks, only one robot may be scoring at a time. This means that only one robot can be completing a task that yields points at a time. At the competition there will only be one judge with one set of eyes on your playing field. For your points to be considered, each action must be done in succession (not necessarily in the order listed below). This is true of all tasks except those that require both robots to be synchronized (Cheering), or tasks in which both robots are performing an activity together (My Plate, Bone Strengthening: Soccer, Gift Giving, Hurricane/Flood Relief)

*Items MUST be at least 1 foot from the target (ie. the 4 food pieces from the myPlate, the book from the library, the vaccine from the nurse’s office, etc.

*You may only use 1 brick per Robot

Health Bot activities (missions):

1. **Decoration: (2:12)**
   Decorate your robot as your favorite healthy food, activity, etc.
   5 points

   *Only ONE robot will be able to score points for this activity. Participants are still encouraged to decorate both robots if using two Health Bots.*

2. **Making healthy choices: (2:22)**
   Robot uses sensor(s) to detect and avoid unhealthy choices. (simply avoiding an area of the table will not earn the team points) Examples could be cigarettes, unhealthy snacks, etc.
   Teams are encouraged to explore a variety of unhealthy activities that their robot can avoid.
   5 points per unhealthy choice avoided. 20 points maximum
10 points per unhealthy choice placed in the garbage. 20 points maximum

*Health Bots can avoid up to 4 unhealthy items for a total of 20 points. IN ADDITION, either the original robot OR the second robot can gain an additional 20 points for trashing up to 2 Unhealthy items, however ONLY ONE ROBOT may score per task, making the maximum number of points for this task 40.

*The Trash may be a 2-D (flat) space labeled as the trash or easily identified as the trash. The size of said space depends on the size of the objects being avoided or placed in the trash.

*There may be multiple trash cans on the field.

*Team members MAY NOT remove items from this trash area to save space on the board.

3. Sleep: (2:52)
   5 points if the robot stops on a bed for 5 seconds (nap).
   10 points if the robot parks on the bed at the end of the match.
   Each robot can do these tasks once.
   a. The video says “each robot can only do this task once” making it sound like the team must choose between the 5 point mid-run nap and the 10 point end-of-the-run sleep. The document says “each robot can do these tasks once” making it sound like each robot can do both the mid-run nap and also the end-of-the-run sleep. Which is it?

   *The Bed May Be a 2-D (flat) image or a readily identifiable representation of a bed.

   *Each Robot can take a nap on the bed, as well as sleep at the end the match on the bed. If using 2 robots, the total number of points possible is 30 (each robot takes a nap on the bed (2x5=10 )+( each robot sleeps (stops) on bed at end of match (2x10=20)).

4. My Plate: (3:09)
   Robot will assemble a my plate as depicted at the myplate website https://www.choosemyplate.gov/. Food items must be picked up one at a time and delivered to the my plate assembly point separately. In other words, a robot must pick up a protein item, deliver it to the my plate, then get a dairy item and deliver it to the my plate and so on. To be successfully delivered, any part of the food item must be within the designated region of the plate; i.e., the item does not have to be completely in the region.

   5 points for each food item successfully delivered if the food and plate are on the robot table.
   10 points for each food item successfully delivered if the food and plate are on a table, in a refrigerator or in a pantry that is at least 4” above the robot table surface.
   10 bonus points per item if the team allows the judge to randomly place the food items in one of five team designated areas. The purpose for this bonus is for teams to demonstrate their use of sensors to be able to identify the food items.
   5 additional bonus points per item for a maximum of 20 points if a food item that the judge randomly places is an unhealthy item that the robot actually avoids.
   10 Bonus points if the assembled my plate has all items and is assembled as depicted in the official myplate logo. If you choose to use the exact myplate logo, be sure to follow the
Either one OR two robots can complete this task. While you can use two robots, you will only receive points per item delivered independent of the number of robots used.

You will be responsible for providing the unhealthy choices if you chose to have them randomly placed by each judge.

Maximum points for this task is 130: (10 points x 5 food items) + (10 bonus x 5) + (20) + (10) = 130.

5. Exercise: (Topic Heading Only)

   1 point per oz that the robot lifts a total distance of 4". The 4" is measured from the starting point of the lift to the ending point of the lift. Maximum weight of 2 lbs.

Scales will be provided by the judges at the competition.

This task can be completed by one or two bots, however between the two bots, no more than 32 points can be scored (16 oz = 1 lb).

7. Aerobic: Jogging (5:02)
   Robot jogs either the length and / or width of the table. Robot must contact the wall at each end of the run.
   10 points for the robot to jog the length of the table.
   5 points for the robot to jog the width of the table.

Both robots can perform both of these tasks (Length and Width) only once. If using 2 robots, 30 points is the maximum for this task.

You cannot perform other tasks (such as avoiding unhealthy objects) during the jog.

8. Bone strengthening: Soccer (5:17)
   Robot scores a goal from a variety of distances. Robot can score a goal from each distance. The robot can score a goal from each location only once UNLESS the ball is retrieved by the second robot. If the ball is successfully retrieved by the second robot, then the first robot can score goals five times from each location.
   The maximum width of the goal is 6".
   The goal cannot be on the second robot.
   The ball must pass completely through the goal before being retrieved by the second robot.
   2 points if the distance is less than 6"
   5 points if the distance is at least 6" but less than 12"
   10 points if the distance is greater than or equal to 12"

Only ONE robot may score goals in this task. If using a second robot, this robot may only retrieve the ball(s) for the first robot. All retrieval methods are acceptable as long as the ball is not in contact with robot 1 when being retrieved by robot 2.
*Guide rails for the balls are not allowed.

*You May Use up to 3 balls for this task (one from each distance).

*Maximum points possible is (2+5+10) x 5 = 85 Points (if using 2 bots), or 17 points if using one bot.

*Soccer Goal must be 3 dimensional with a post on either side of the goal. Soccer Goal does not need a back, just 2 posts denoting the goal.

9. Mental Health: (Topic Heading Only)

10. Gift Giving: (5:48)
    Robot 1 delivers a gift to robot 2 that that is not initially contacting robot 1:
    5 Points if the gift is on the floor and robot 1 delivers it close to robot 2, and robot 2 goes and picks it up.
    10 Points if robot 1 brings a gift to robot 2 and both are contacting the gift after it is delivered. Gift must start at least 4" from the robot table surface.
    15 Points if robot 1 places a gift on robot 2. Robot 1 must pick the gift up from a location before delivering the gift to robot 2, both robots must be in contact with the gift simultaneously when the gift is delivered, and the gift is not touching robot 1 after it has been delivered.

*ALL 3 options may be attempted, however, you will ONLY receive points for the highest point task completed, not for each.

*Each robot can complete this task, for a total of 30 possible points if using 2 robots.

11. Cheering: (6:36)
    Robots either make noise, spin in circles, make arm motions, do a dance, etc.
    5 points for robots randomly cheering the other robot.
    10 points if the cheers are either synchronized or if robot 1 cheers robot 2 while robot 2 is performing a task.

*Between the 2 Robots, this task can be done a maximum of 5 times for a maximum possible total of 50 points.

12. Psychological: Library visit (7:03)
    Robot returns book to the library.
    5 points if the book is on the robot table surface.
    10 points if the book is picked from a location above the table and delivered to the library above the robot table surface.

*Height above the table surface must be at least 4” if attempting 10 point option.

*Each Robot May Perform this task ONCE for a maximum possible total of 20 points.

Environmental Health – (Topic Heading Only)
Vaccines (7:31) (not numbered in the video)
robot picks up vaccinations and delivers it to a nurse office;
5 points if the vaccine is on the robot table surface.
10 points if the vaccine is picked from a location above the table and delivered to the nurse's office above the robot table surface.

*Height above the table surface must be at least 4” if attempting 10 point option.

*Each Robot May Perform this task ONCE for a maximum possible total of 20 points.

13. Distribute winter clothing (7:58)
bring a scarf, boots, gloves, and / or hat, from distribution center to nurse’s office, library, school, or 2nd robot. Items must be delivered individually.
5 points for each item delivered.
10 point bonus if all four items are delivered.

*ONLY 1 Robot May accomplish this mission

*The Nurse’s Office, Library, and School may be 2-D (flat) representations of the target location.

* Items do not need to be full sized, however must be readily identified as a scarves, boots, gloves or hats. Each can be in a Lego box for example, as long as it is appropriately labeled.

14. Hurricane/flood relief (8:25)
rescue a person (minifigure) from the top of houses: Maximum of two separate houses.
2 points for 3” tall house
5 points for 6” tall house
10 points for 9” tall house.
5 point bonus per person if the robot takes the person to the school

*Each Robot may be involved with this task, however only 2 figures total from 2 houses total may be rescued. This equals a maximum total of 30 points.

15. Asthma (8:51)
Install scrubber on smokestack. Smokestack must be at least 12” tall with a maximum diameter of 3”. Cap (scrubber) is a maximum of 4” in diameter or 4” per side. (20 points)

*This task can only be completed by one robot.