



CHALLENGE #1 - Minesweeper

Description:

In many countries, during and after wars, dangerous land mines are left buried. Robots have been used to try and detect these mines so no one is injured by the remaining mines.

The purpose of this challenge is to have your robot move within a designated area and detect the mines. Your team can build the robot in any configuration that suits the challenge, as long as you use only one standard Lego NXT robotics kit.

Please refer to the following page for a schematic of your mine field. You will need two (22" x 28") black poster boards to reproduce this field, 6 yellow circles, 5 ½" diameter, 6 red plastic cups, 18 oz., 3 ½" diameter, colored electrical tape and white poster board.

The robot should detect all the mines.

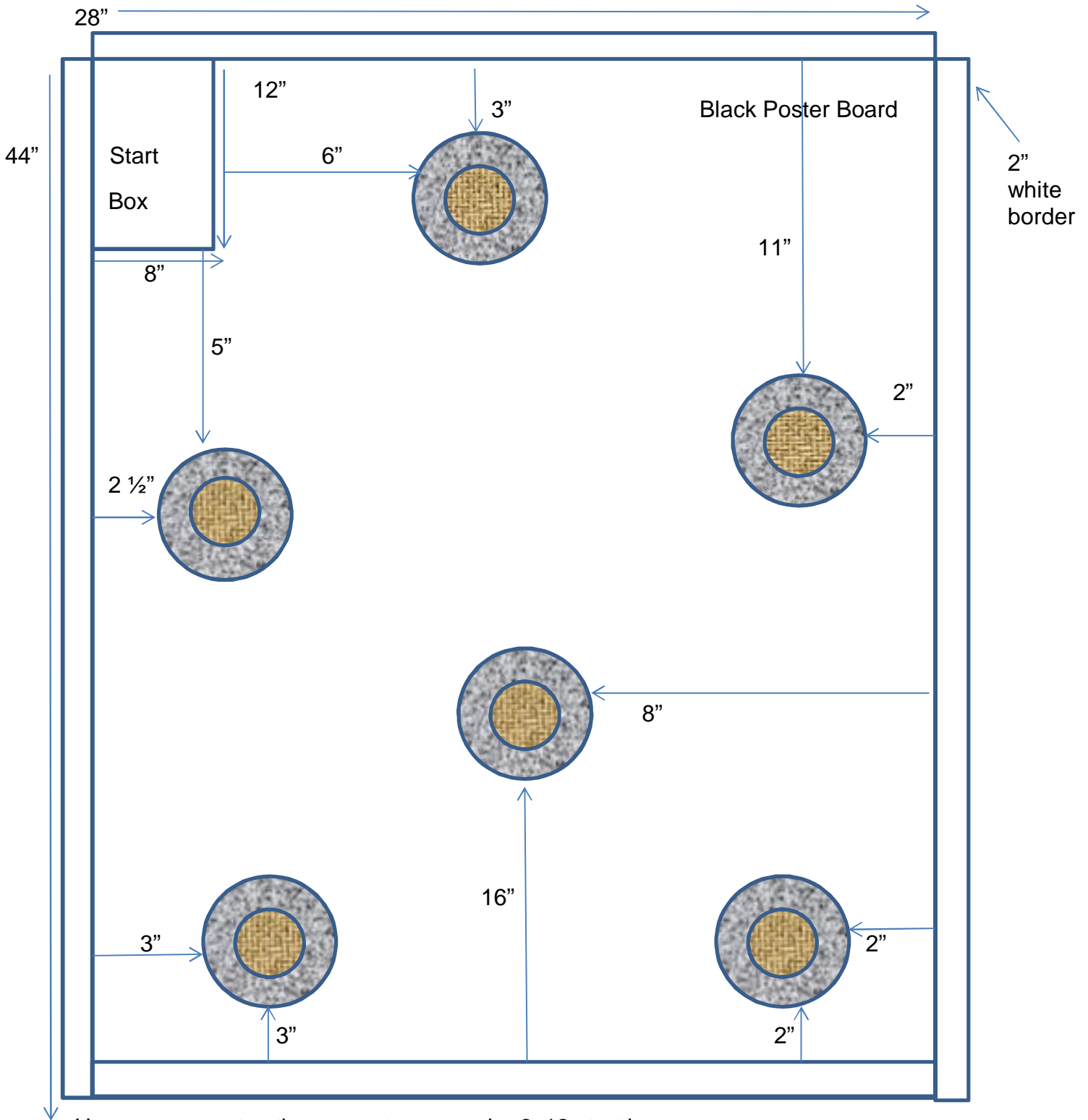
Rules:

1. At the start, the robot must stand completely inside the start box.
2. The robot must be set in motion with the clap of a hand.
3. The robot must now proceed to detect each of the mines. For maximum points, the robot must push the mine (red cup) out of the danger zone (yellow dot). The robot must then detect the yellow dot and make some sort of audible signal to let the judge know that the yellow dot has been detected. Once the noise is made a human will interfere and pick up the mine (red cup).
4. The robot must detect all six mines. At no time can the robot's wheels touch a yellow dot.
5. At the end of the routine the robot must return to the start box and must announce in some way that it has completed the task. For maximum points the robot must be entirely within the start box.

Developed by Amy Mitchell, Crawford County 4-H Youth Development Agent, University of Wisconsin-Extension.


Diagram of Playing Field for Minesweeper Challenge

Diagram is not to scale. Add a white 2" poster board perimeter to assist the robot with not going outside the mine field.



Use green construction paper to create the 8x12 start box.

Yellow dots  = 5 1/2" diameter

Red cups  18 oz. red cups, 3 1/2" diameter, red cups are placed in center of yellow dots

4-H Robotics Rally Grading Rubric – Challenge: Minesweeper

		Points Available	Points Gained
1	At the start, the robot must stand completely inside of the start box.	5	
2	The robot must be set in motion at the clap of a hand.	5	
3	Once the robot enters the field, at no time can any part of the robot go beyond the boundaries of the 'field' (off the black poster board).	10	
4	At some time, during the routine, the robot must detect each of the 6 mines in some way that is audible to the judge.	60	
5	After detecting all 6 mines in the field, the robot must return to the start box.	10	
6	The robot must announce in some way that it has completed the task.	5	
7	Submitted an annotated printout of the programming code.	5	
	Total	100	



CHALLENGE #2 – Create Your Own Challenge

Description

Teams must work together to create their own unique, creative, and innovative Lego NXT robotics challenge. The challenge must be created in a way such that the other teams will be able to build/modify their robot and program their challenge solution within two hours. Each team will demonstrate their challenge for participating opponents. Teams will then have two hours to replicate the challenge. Prizes will be awarded for creative and innovative challenges.

Rules

1. Teams can only use one standard Lego Mindstorms NXT base kit.
2. Teams must be able to demonstrate their challenge to all other groups.
3. Teams must bring three copies of written instructions for the challenge as demonstrated for Challenge 1: Mindsweeper Grading Rubric.
4. A reasonable effort must be made by the team to create a challenge that can be solved within a two-hour timeframe.
5. Teams must bring a printout of the programming code used to solve the challenge.
6. If a board or other equipment is needed for the challenge, the team that created it must provide it for the other teams to use.