2022 OVERVIEW Rules, Deadlines and Rubrics

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Backstory Application and Inspiration:

Robotics are being implemented into every aspect of modern-day tasks. Check out this short video to see how a local mushroom farm has developed their own automated robotic mushroom picking system which became the inspiration to this year's challenge.

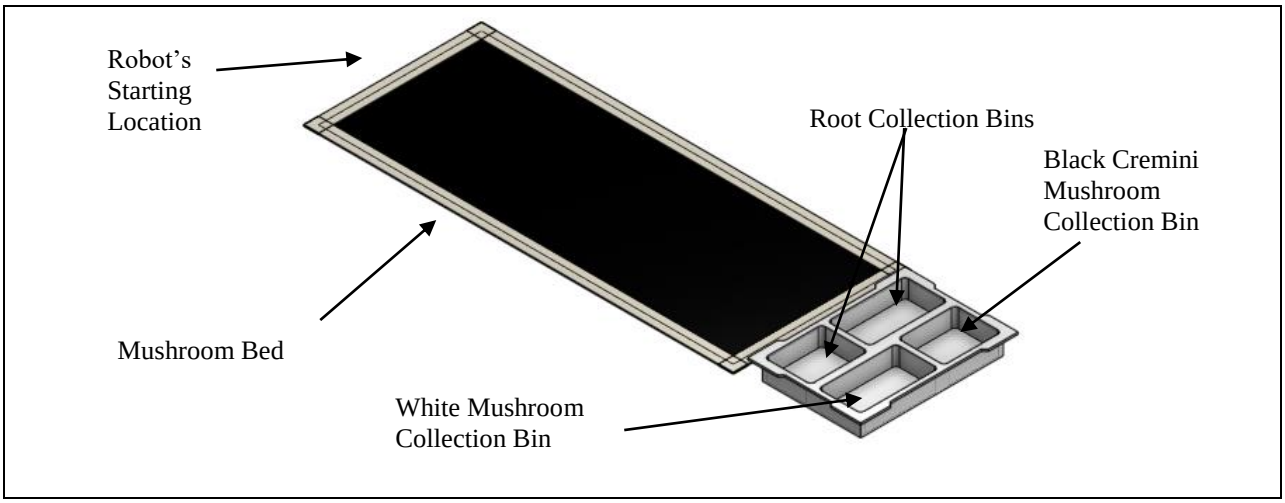
https://www.youtube.com/watch?v=2vv4rQj52Bc

Challenge Overview:

For the 2022 Challenge, each team is to design and fabricate an autonomous "mushroom harvesting" robot. You will be supplied with foam target objects (representing "mushrooms") of varying sizes and colours. The mushrooms will randomly grow (i.e., randomly placed by the judges) in the mushroom bed. Your robot must scan the mushroom bed for ready-to-pick mushrooms (i.e., that are the correct height). Whenever a ready-to-pick mushroom is found, your robot must pick the mushroom, determine the type of mushroom (cremini=black, white=white), and remove its root. The roots must be disposed into the roots bin, the white mushrooms must be placed in the white mushroom bin, and the cremini mushrooms must be placed in the black mushroom bin.

The Mushroom Bed Setup:

The mushroom bed will consist of a ½ sheet of regular black Bristol board measuring 11" X 28". The perimeter of the mushroom bed will be bordered with a strip of 1" wide masking tape (to hold down the bed to the table); the tape will overlap the Bristol board by half of the tape's width (i.e., 1/2"). The robot's starting location will be at one (narrow) end of the mushroom bed. One of the two supplied Lego bins will be placed at the opposite (narrow) end of the mushroom bed. The two sections closest to the mushroom bed will be used to collect the roots. The smaller section furthest from the mushroom bed will be used to collect the black cremini mushrooms and the larger section furthest from the mushroom bed will be used to collect the white mushrooms. See the diagram below for clarification.

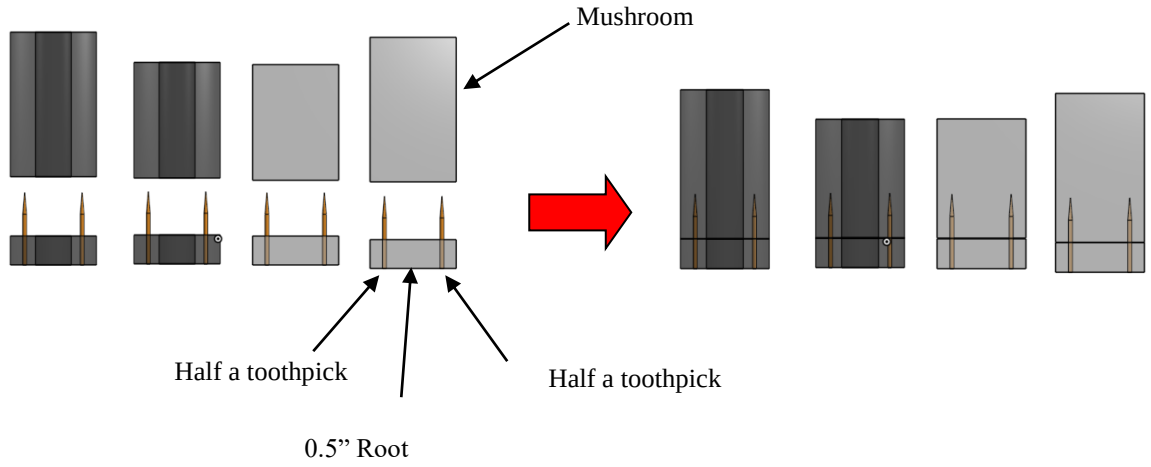


Mushrooms:

Each team will be supplied with 2 of12" length of pink 1½" x 1½" foam and 2 of 12" length of 1½" diameter black foam. To create the different size of mushrooms, teams must accurately cut each piece of foam to the following lengths:

Pink Foam:	4 Pieces 2"	Black Foam: 4 Pieces 2"
	4 Pieces 2.5"	4 Pieces 2.5"
	8 Pieces 0.5" (roots)	8 Pieces 0.5" (roots)

Each mushroom will be assembled by attaching a 0.5" root piece to a 2" or 2.5" mushroom piece using two halves of a toothpick as depicted below.

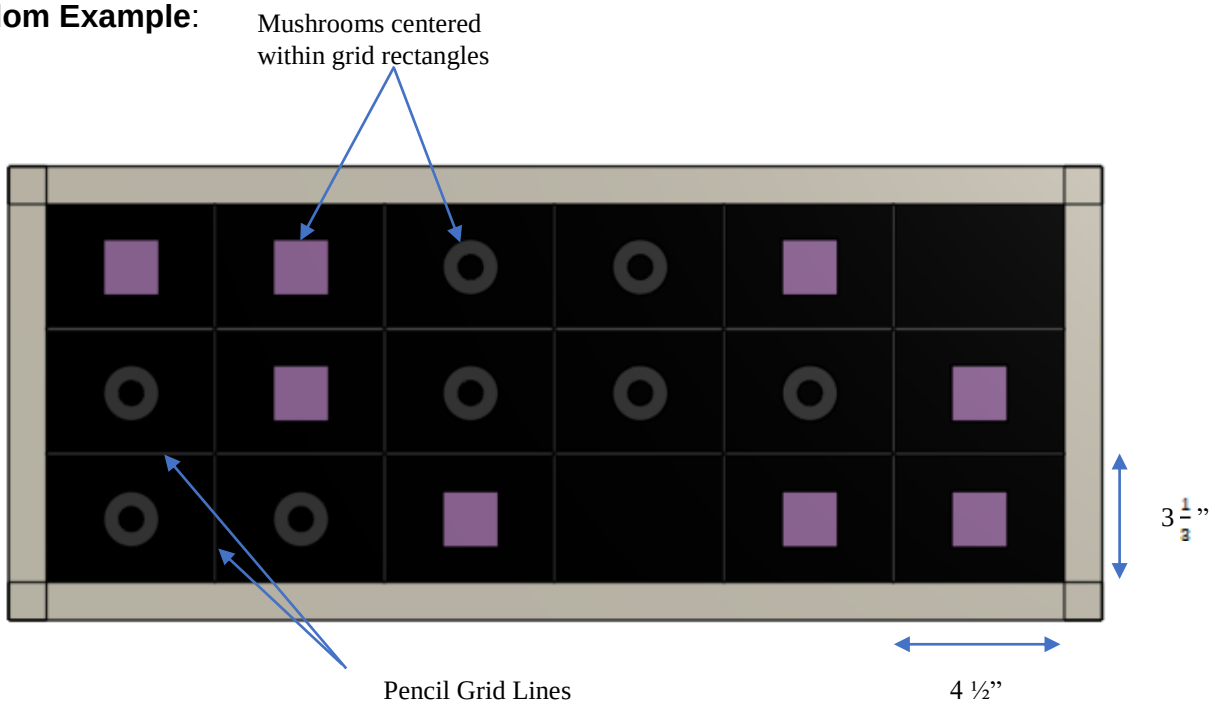


Note, the black foam has a factory cut running lengthways with self-adhesive strip. The yellow protective tape should be removed, and the two self-adhesive surfaces should be stuck together to form a continuous tube.

Mushroom Placements on the Mushroom Bed:

The mushroom bed will be sectioned into 3 rows ($3\frac{1}{3}$" long) and 6 columns ($4\frac{1}{2}$" wide) by a pencil line grid as depicted in the picture below. The 16 assembled mushrooms will be randomly placed by the judges on the mushroom bed area within the 18 rectangles created by the grid. Each mushroom will be centered within each $3\frac{1}{3}$" x $4\frac{1}{2}$" grid rectangle. Two rectangles will not have a mushroom.

Random Example:



"Ready-to-pick" mushrooms measure 3" (i.e., 2.5" mushroom + 0.5" root) in height.

Not fully grown mushrooms measure 2.5" (i.e., 2" mushroom + 0.5" root) in height; these are not ready for picking and should remain untouched.

Covid-19 Safety Measures and Requirements:

The OIYRC has planned to hold a more traditional in-person event this year. All of the participants must follow the requirements and restrictions set out by the Public Health Unit and School Boards at the time of the competition. We may have to pivot to a virtual competition depending on how the public health unit situation develops over the next few months. In the event of a virtual competition, an operational video demonstration of your robot will need to be submitted which will be due on Tuesday, November 15th, 2022. The operational video demonstration requirements will be as follows:

I. Everyone shown in the video must be practicing all school based COVID-19 protocols required by your local public health unit at the time of the recording
II. Operational videos may not be edited in anyway
III. Operational videos may not be longer than 6 minutes in length (1 minute introduction/setup, 4-minute operation, and 1 minute scoring).
IV. The name of your School & Team must be identified at the beginning of the video
V. Position the camera looking down on the mushroom bed so that the whole mushroom bed and collection bin is visible

VI. Dump the mushrooms onto the mushroom bed (e.g., from a box) and randomly place them into their positions from the dumped pile.
VII. Place a 4-minute timer countdown across from the camera at the back of the mushroom bed.
VIII. Someone should say, “Ready, set, go.” at which point the timer should start and the robot may start
IX. Once the timer hits 0 or the demonstration is over, complete the scoring and show your final score to the camera

Scoring Calculation: Points will be as follows:

Result	Points
Ready to Pick Mushroom colour sorted in correct mushroom bin	+4 Points
Ready to Pick Mushroom colour sorted *incorrectly* in mushroom bin	+3 Points
Trimmed Root in a root bin	+2 Points
Root in a mushroom bin	-1 Point
Robot Disturbs not ready to pick mushroom	-2 Points (for each touch)

All questions regarding technical support (robot and/or challenge) should be emailed to **BOTH**: Mark Janes m.janes@tvdsb.ca Glenn Raake graake@ldcsb.ca

Teams and Deadlines

- Teams may represent a school, a club or youth group
- Teams will have at least four (4) high school aged youth members
- Teachers and mentors (upon availability) may only act in an advisory role

- Team submissions emailed to jane@workforcedevelopment.ca
- October 18, 2022 – team name, student names, team photo (JPG file), photo release forms, and media quotes
- November 7, 2022 – preliminary video – written report
- November 15, 2022 challenge day (up to 5 students can be present)

Challenge Rules:

1. Only the Lego Spike Kit and Expansion Kit provided may be used to build the robot. Uses of extra materials or parts are not allowed in the robot.

2. The use of glue, tape wire, etc. is prohibited in the fabrication of the robot. No parts may be cut, drilled or otherwise modified.

3. Teams must purchase their own sheet of black Bristol board and 1" wide masking tape.

4. The mushrooms will be randomly placed on the mushroom bed by the judges prior to starting. The robot operator will then start the picking operation (i.e., using a start button on the Hub Set.) Once the picking operation has started, no human assistance may be used.

5. The collection bins are too small to contain all required mushrooms and roots. Each time a mushroom and/or root has been delivered into a bin, the operator may remove the mushroom and/or root to make room for another mushroom and/or root to be delivered into the bin. The judge will keep track of mushroom and/or root placements within the bin for proper scoring calculations.

6. Each team will be given a maximum of 4 minutes to demonstrate the picking process.

7. If the operator must intervene during a picking operation, the operation must be stopped. The team can choose to tally their score at this time OR all mushrooms must be replaced on the mushroom bed and the process can be re-started using the remaining time left (from the 4 minutes).

8. The harvesting process will be timed; the robot will be judged for its time efficiency. The team with the highest score will be awarded Platinum Level achievement. In the event of a tied score, the most efficient robot (i.e., with the fastest time to complete the task) will be awarded Platinum Level.

9. Additional operational points (maximum of 2) may be awarded for supplementary features incorporated into the robot design (e.g., lights/sounds outputted by the Hub Set indicating sensor input or program state.)

9. Your robot cannot disturb (i.e., touch/contact) the mushroom bed or any not ready-to-pick mushroom at any time. In addition, a harvested mushroom should not disturb (i.e., touch/contact) any not ready-to-pick mushroom during its delivery. Points will be deducted.

10. No part of the robot may remain in contact with the mushroom or root once it is placed in the bin. If contact is present, no points will be allotted for the placement.

11. Toothpicks holding mushrooms and roots together will not be observed during the scoring process. Thus, a toothpick can be in a roots bin or a mushroom bin.

12. The team must document their project from start to finish in a written report. In addition, they must submit a final maximum 10 minute video outlining the struggles and achievements encountered in the process. The final functioning robot should be shown completing the task. Instructions for submitting the written report and the final video will be found on the OIYRC website and must be submitted by November 7, 2022.

13. Each team (up to 5 students) must be present at Goff Hall for the Challenge on November 15, 2022. Each team must connect with their mentor (upon availability). Any team that misses the event will be required to return the Lego Kit in its entirety.

14. **Overall Scoring Calculation:** The final overall score will be as follows:

Challenge Component	**Possible Score**
Operation	/ 50
Presentation	/ 30
Video	/ 10
Written Report	/ 10
Final Score	**/100**

Skillful design and programming will ensure the robot can *efficiently* complete the repetitive task on its own without the assistance of the team members.

OIYRC's goal this year is full participation from each team. ***Each team MUST be at the challenge with a functioning robot in order to keep the Lego Spike Kit.***

The kits are generously provided by our sponsors. Each team will be provided with the name of their sponsor. Teams are expected to learn about their sponsor and proudly exhibit their sponsor's name on their display.

Teams might be provided with a mentor (upon availability) to advise and assist the team throughout the process. These mentors volunteer their time. Mentors might also be able to provide opportunities for plant tours to view robots in an industrial environment.

All questions regarding submissions addressed to jane@workforcedevelopment.ca

OPERATION RUBRIC:

Bronze Level	Silver Level	Gold Level
Total points awarded for harvesting mushrooms (1-16 points) _____**Points**	Total points awarded for harvesting mushrooms (17-31 points)	Total points awarded for harvesting mushrooms (28-48 points) _____**Points**
Time taken to harvest all 8 ready-to-pick mushrooms without human assistance **Time:** _____	Time taken to harvest all 8 ready-to-pick mushrooms without human assistance **Time:** _____	Time taken to harvest all 8 ready-to-pick mushrooms without human assistance **Time:** _____
Additional supplementary robot feature #1 (e.g., lights/sounds) _____ (Description) **Yes (1) / No (0)**	Additional supplementary robot feature #1 (e.g., lights/sounds) _____ (Description) **Yes (1) / No (0)**	Additional supplementary robot feature #1 (e.g., lights/sounds) _____ (Description) **Yes (1) / No (0)**
Additional supplementary robot feature #2 _____ (Description) **Yes (1) / No (0)**	Additional supplementary robot feature #2 _____ (Description) **Yes (1) / No (0)**	Additional supplementary robot feature #2 _____ (Description) **Yes (1) / No (0)**
Total Score _____ **(Maximum 18)**	**Total Score** _____ **(Maximum33)**	**Total Score** _____ **(Maximum 50)**

Instructions to Judges:

Write **Team Name** at top of sheet

1. Evaluate robot operation using criteria stated above.
2. Time the operation using a stop watch, record the time on the sheet.
3. Identify the resulting scoring level and calculate Operation Final Score
4. Circle **B** (Bronze) or **S** (Silver) or **G** (Gold) at top of page
5. Write any special remarks below:
6. Thank Team for effort, move to next table

Operation Final Score = ____ / 50

PRESENTATION RUBRIC:

	Bronze Level	Silver Level	Gold Level
Oral Presentation	Default level. Presentation is made but lacks preparation and direction. Important details are missing Time runs over 5 minute limit.	Well prepared presentation is well organized and includes: -introduction of team members -sponsor and mentor info -clear explanation of robot operation	Presentation is polished and smooth. Three or more team members participate in the presentation.
/20	**2 4 6 8 10**	**12 14 16**	**17 18 19 20**
Robot Display	Robot kit is present in its entirety. Table is organized with minimal information or display	Display is well designed with poster and graphics. Sponsor name and logo is identified	As in silver level plus photos used to 'tell the story' behind the project
/10	**1 2 3 4 5**	**6 7 8**	**9 10**

Instructions to Judges:

1. Write **Team Name** at top of sheet
2. Evaluate team report against the stated criteria
3. Underline each achieved criteria
4. Identify the resulting scoring level
5. Circle **B** (Bronze) or **S** (Silver) or **G** (Gold) at top of page
6. Calculate Presentation Final Score.
7. Write any special remarks below:
8. Thank Team for effort, move to next table

Presentation Final Score = ____ /30

VIDEO RUBRIC:

	Bronze Level	Silver Level	Gold Level
Video Submission	Video includes two of the following: -complete team -operation of robot -simple to follow -no gimmicks -only necessary info -under ten minutes	Video is clear and includes four of the following: -complete team -operation of robot -simple to follow -no gimmicks -only necessary info -under ten minutes	Video is clear and includes all of the following: -complete team -operation of robot -simple to follow -no gimmicks -only necessary info -under ten minutes
/10	**1 2 3 4 5**	**6 7 8**	**9 10**

Instructions to Judges:

1. Write **Team Name** at top of sheet
2. Evaluate team report against the stated criteria
3. Underline each achieved criteria
4. Identify the resulting scoring level
5. Circle **B** (Bronze) or **S** (Silver) or **G** (Gold) at top of page
6. Calculate Video Final Score
7. Write any special remarks below:

Video Final Score = ____ /10

WRITTEN REPORT RUBRIC:

	Bronze Level	Silver Level	Gold Level
Written Report	Basic written report only	Detailed written report Including: -mentor profile -sponsor info -concept diagrams -program script	As in silver level with superior report detail and professional formatting. Report is well organized and attractive.
/10	**1 2 3 4 5**	**6 7 8**	**9 10**

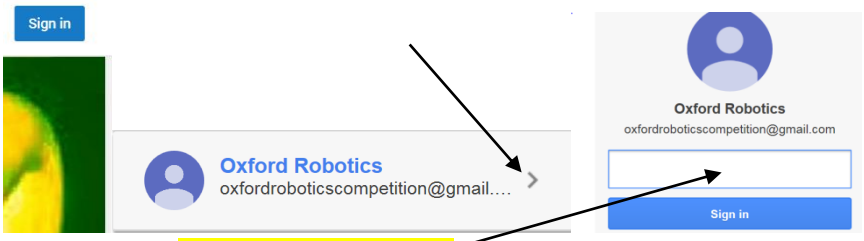
Instructions to Judges:

1. Write **Team Name** at top of sheet
2. Evaluate team report against the stated criteria
3. Underline each achieved criteria
4. Identify the resulting scoring level
5. Circle **B** (Bronze) or **S** (Silver) or **G** (Gold) at top of page
6. Calculate Written Report Final Score
7. Write any special remarks below

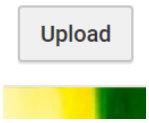
Written Report Final Score = ___ /10

Instructions on submitting video on YouTube for judging:

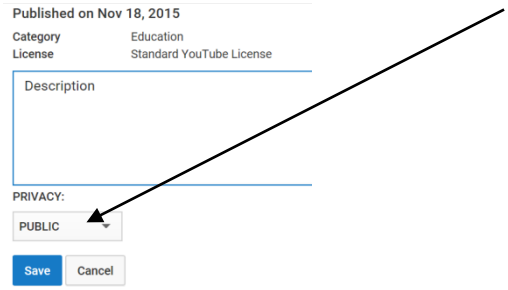
1. Name your video with your school name and team name. Save it.
2. Click here: http://www.youtube.com/user/OxfordRoboticsChalle
3. See upper right screen, click “Sign In”; then
4. You may be asked to use an existing Google account. CAUTION: do not use any other account. **Click “Add An Account**” to use the “Oxford Robotics” Account
5. If your screen says “Oxford Robotics” Click on the right “>” to enter Sign in with the email account oxfordroboticscompetition@gmail.com



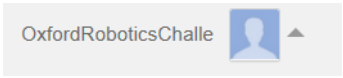
6. Password is: 2roboticsoxford#2 (Please don’t share)
7. Click on “upload” at the top. REMEMBER to allow enough time for upload.



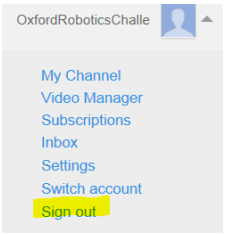
8. Please remember to make your video public.



9. Remember to log out when upload is completed. Screens may look different depending on the operating system. Click on:



10. From the drop down list, click “sign out”:



11. If you have concerns uploading to YouTube please contact us by email for assistance at jane@workforcedevelopment.ca