



# 2023 OIYRC

- **OVERVIEW**
- **RULES**
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- **SCORING**
- **RUBRICS**

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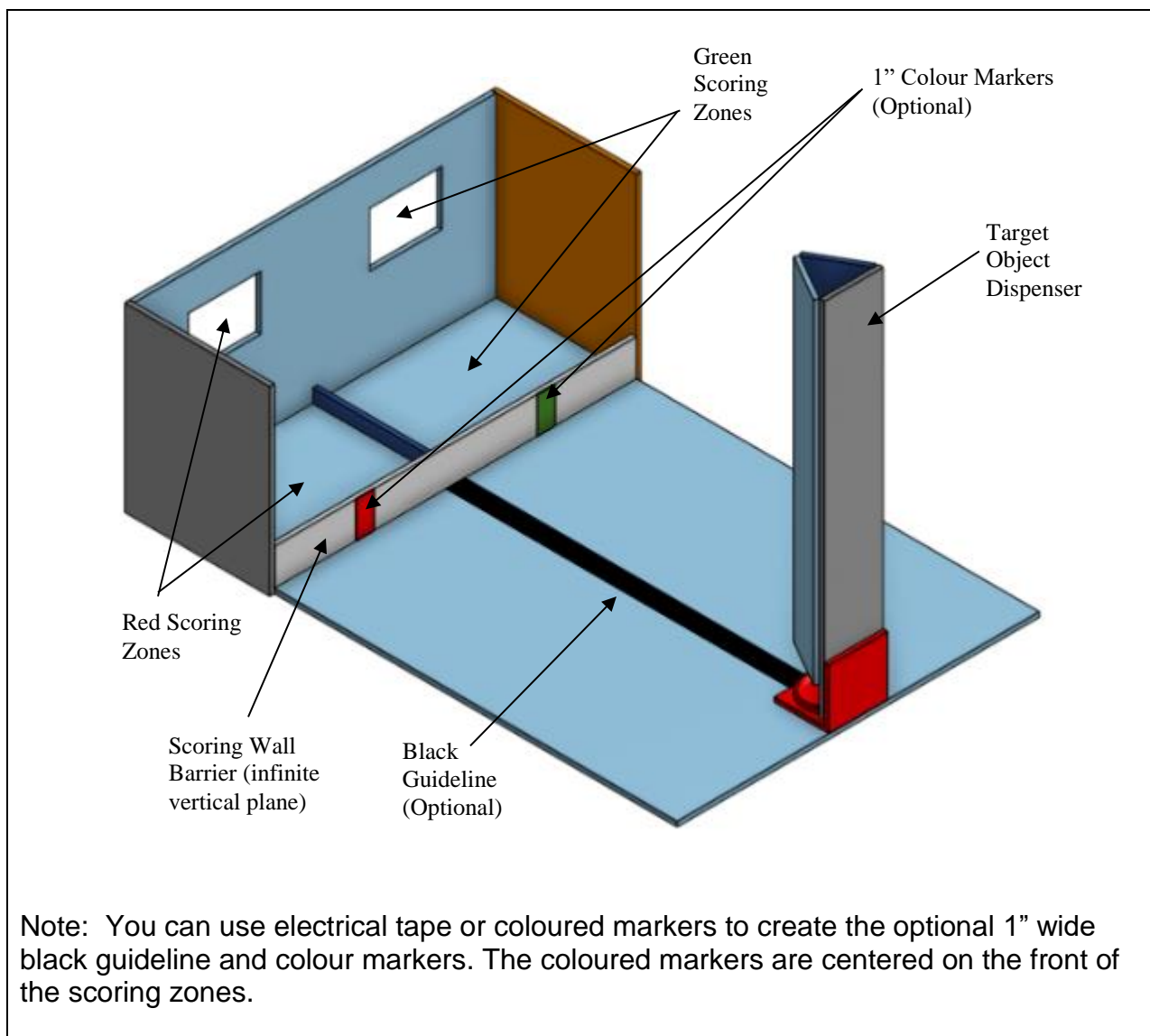
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## Challenge Overview:

For the 2023 OIYRC Challenge, each team is to design and fabricate an autonomous “ball-tossing” robot. You will be supplied with 5 red target objects and 5 green target objects (e.g., ping pong balls). The target objects will be randomly loaded into a triangular prism dispensing mechanism at one end of the court. Your robot must collect the target objects from the dispenser and deliver them to the two colour-corresponding scoring zones to obtain as many points as possible within two 2-minutes gameplays.

## The Court:

The court will be constructed from two sheets of white foam board each measuring 20” X 30” (not provided). See the attached appendices for court construction details.



**Scoring Calculation:** Points will be as follows:

Result	Points
High goal AND correct colour	+ 5 Points
High goal but not correct colour	+ 3 Points
Low goal AND correct colour	+ 3 Points
Low goal but not correct colour	+ 1 Point

**All questions regarding technical support (robot/challenge) can be emailed to**

**BOTH:** Mark Janes [m.janes@tvdsb.ca](mailto:m.janes@tvdsb.ca) (and) Glenn Raake [graake@ldcsb.ca](mailto:graake@ldcsb.ca)

### **Teams**

- Teams may represent a school, a club or youth group.
- Teams will have at least four (4) high school aged youth members.
- Teachers and adult mentors may only act in an advisory role.
- A team field trip to a manufacturing facility is strongly encouraged.
- Challenge Day: up to 5 members must be present at Goff Hall

**Team Deadlines:** emailed to [jane@workforcedevelopment.ca](mailto:jane@workforcedevelopment.ca)

#### **October 30, 2023**

- Team name & student names
- Team photo & photo release forms
- Team media form

#### **November 22, 2023**

- Written Report
- Video (upload on YouTube)

#### **November 30, 2023** Challenge Day

### **Challenge and Gameplay Rules:**

1. Only the Lego Spike Kit and Expansion Kit provided may be used to build the robot. Use of extra materials or parts are not allowed in the robot other than the supplied worm gear (1) and elastic bands (5).
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 sheets of white foam board and construct the court as accurately as possible following the drawings provided (see attached appendices.) If the court construction is not with  $\pm \frac{1}{4}$ " ( $\pm 5\text{mm}$ ) accuracy, the court will not be permitted, an alternate court with tolerance may be supplied by OIYRC.
4. Your robot must be in contact with any part of the dispenser at the start of the game.
5. Your robot may be in possession of three (3) target objects (ping pong balls) before the start of the game.
6. Seven (7) target objects must be randomly loaded into the dispenser by the judges prior to the start of the game.
7. The robot operator must push a "start" button on the Hub Set to begin the game. At this point, the timer (i.e., judge) will start tracking the 2-minute game time. No human assistance is permitted during the 2-minute game play. If all target objects have been delivered into the scoring area before the 2-minute gameplay is over, the timer will be stopped, and the time will be recorded.
8. If the operator must intervene during the game, the operation and timer must be stopped. The team can choose to tally their score at this time OR all target objects (including the ones already in the scoring zone) must be (randomly) replaced into the dispenser and the game can be re-started using the remaining time left (from the 2 minutes). Note, your robot may be preloaded with three target objects before the game is restarted.
9. Each team will be given two two-minute game plays and combine their scores from each game for a total score.
10. Each game will be timed; the robot will be judged for its time efficiency. The team with the highest combined two-game score will be awarded Platinum Level achievement. In the event of a tied score, the most efficient robot (i.e., with the fastest combined time to complete the task) will be awarded Platinum Level.
11. Additional operational points (maximum of 10) 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.)
12. The robot can use various sensors to navigate itself throughout the court and position into desired scoring and retrieving locations.
13. At no point is the robot allowed to exit the court or cross the infinite vertical plane of the scoring wall barrier.

14. The robot is not permitted to be in possession of more than three (3) target objects at any given time.
15. Balls that exit the court area are deemed “out of play” and cannot be used to score points.
16. Rebound balls or balls that have been “lost” (out of possession) that remain within the court can be retrieved for scoring.
17. Balls in the scoring area cannot be retrieved (i.e., the robot would cross the vertical plane of the scoring wall barrier)
18. The team must document their project from start to finish in a written report. In addition, they must submit a final 10 minute (maximum) 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 22, 2023.
19. Each team must be present at Goff Hall for the Challenge on November 30, 2023. Each team must contact their mentor (if available). **If any team misses the event they will be required to return the Lego Kit in its entirety.**

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

Challenge Component	Possible Score
Operation	/50
Presentation	/20
Video	/15
Written Report	/15
<b>Final Score</b>	<b>/100</b>

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.

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

All questions regarding submissions should be sent to [jane@worforcedevelopment.ca](mailto:jane@worforcedevelopment.ca)

## Scoring Calculation:

### Gameplay #1 (2-Minutes)

Result	Points Per Ball	Tally (# Balls)	Points
High goal AND correct colour	+5 Points/ball		
High goal but not correct colour	+3 Points/ball		
Low goal AND correct colour	+3 Points/ball		
Low goal but not correct colour	+1 Point/ball		
<b>Total Points Gameplay #1</b>			
<b>Time* (Seconds-Max 120)</b>			

\* Time taken to play all ten balls until all balls are no longer in play without human assistance.

### Gameplay #2 (2-Minutes)

Result	Points Per Ball	Tally (# Balls)	Points
High goal AND correct colour	+5 Points/ball		
High goal but not correct colour	+3 Points/ball		
Low goal AND correct colour	+3 Points/ball		
Low goal but not correct colour	+1 Point/ball		
<b>Total Points Gameplay #1</b>			
<b>Time* (Seconds-Max 120)</b>			

\* Time taken to play all ten balls until all balls are no longer in play without human assistance.

<b>Combined Total Points (Gameplay #1 + Gameplay #2)</b>	
<b>Combined Time (Gameplay #1 + Gameplay #2)</b>	

## OPERATION RUBRIC:

Bronze Level	Silver Level	Gold Level
<b>COMBINED 2-GAME TOTAL POINTS SCORE</b>  Total points achieved (1-20 points)  _____ Points	<b>COMBINED 2-GAME TOTAL POINTS SCORE</b>  Total points achieved (21-59) points  _____ Points	<b>COMBINED 2-GAME TOTAL POINTS SCORE</b>  Total points achieved (60-100 points)  _____ Points
<b>COMBINED 2-GAME TIME</b>  Time: _____ (Seconds)  (Max 240 Seconds)	<b>COMBINED 2-GAME TIME</b>  Time: _____ (Seconds)  (Max 240 Seconds)	<b>COMBINED 2-GAME TIME</b>  Time: _____ (Seconds)  (Max 240 Seconds)
Additional supplementary robot feature #1 (e.g., lights/sounds)  _____ (Description)  <b>Yes (5 Points) / No (0 Points)</b>	Additional supplementary robot feature #1 (e.g., lights/sounds)  _____ (Description)  <b>Yes (5 Points) / No (0 Points)</b>	Additional supplementary robot feature #1 (e.g., lights/sounds)  _____ (Description)  <b>Yes (5 Points) / No (0 Points)</b>
Additional supplementary robot feature #2  _____ (Description)  <b>Yes (5 Points) / No (0 Points)</b>	Additional supplementary robot feature #2  _____ (Description)  <b>Yes (5 Points) / No (0 Points)</b>	Additional supplementary robot feature #2  _____ (Description)  <b>Yes (5 Points) / No (0 Points)</b>
<b><u>Total Score</u></b>  _____  <b>Maximum 30)</b>	<b><u>Total Score</u></b>  _____  <b>Maximum 69</b>	<b><u>Total Score</u></b>  _____  <b>Maximum 110</b>

### Instructions to Judges:

Write **Team Name** at top of sheet

1. Evaluate robot operation using criteria stated above.
2. Time each Game 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 = Total Score X 0.455**



**Operation Final Score = \_\_\_\_\_ / 50**

**PRESENTATION RUBRIC:**

	Bronze Level	Silver Level	Gold Level
<b>Oral Presentation</b>	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.
<b>/10</b>	<b>1 2 3 4 5</b>	<b>6 7 8</b>	<b>9 10</b>
<b>Robot Display</b>	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
<b>/10</b>	<b>1 2 3 4 5</b>	<b>6 7 8</b>	<b>9 10</b>

**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 = \_\_\_\_\_ /20**

**VIDEO RUBRIC:**

	Bronze Level	Silver Level	Gold Level
<b>Video Submission</b>	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
<b>/15</b>	<b>1 2 3 4 5</b>	<b>6 7 8 9 10</b>	<b>11 12 13 14 15</b>

**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 = \_\_\_\_\_ /15**

## WRITTEN REPORT RUBRIC:

	Bronze Level	Silver Level	Gold Level
<b>Written Report</b>	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.
<b>/15</b>	<b>1 2 3 4 5</b>	<b>6 7 8 9 10</b>	<b>11 12 13 14 15</b>

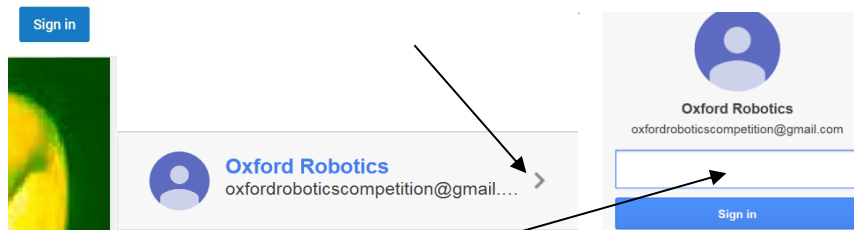
### Instructions to Judges:

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

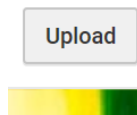
**Written Report Final Score = \_\_\_\_\_/15**

## Instructions on submitting video on YouTube for judging:

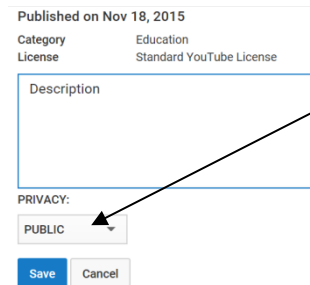
1. Name your video with your school name and team name. Save it.
2. Click here: <http://www.youtube.com/user/OxfordRoboticsChalle>
3. See upper right screen, click "Sign In"; then
4. You may be asked to use an existing Google account. CAUTION: do not use any other account. **Click "Add An Account"** 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](mailto:oxfordroboticscompetition@gmail.com)



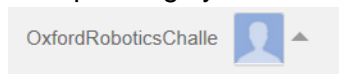
6. Password is: **2roboticsoxford#2** (Please don't share)
7. Click on "upload" at the top. REMEMBER to allow enough time for upload.



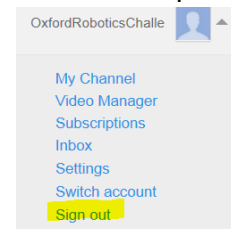
8. Please remember to make your video public.



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



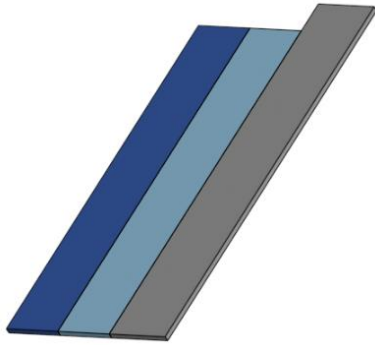
10. From the drop down list, click "sign out":



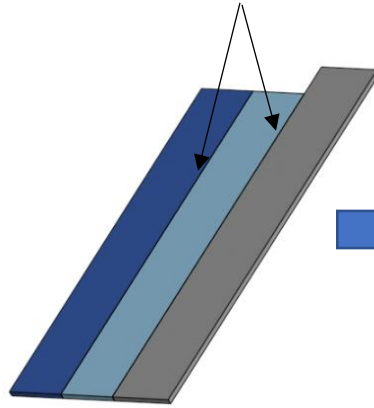
11. If you have concerns uploading to YouTube please contact us by email for assistance at [jane@workforcedevelopment.ca](mailto:jane@workforcedevelopment.ca)

## Appendix #1: Dispenser Construction Details

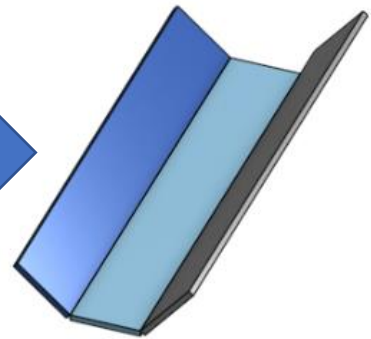
**Step #1:**  
Cut out Prism Piece  
perimeter



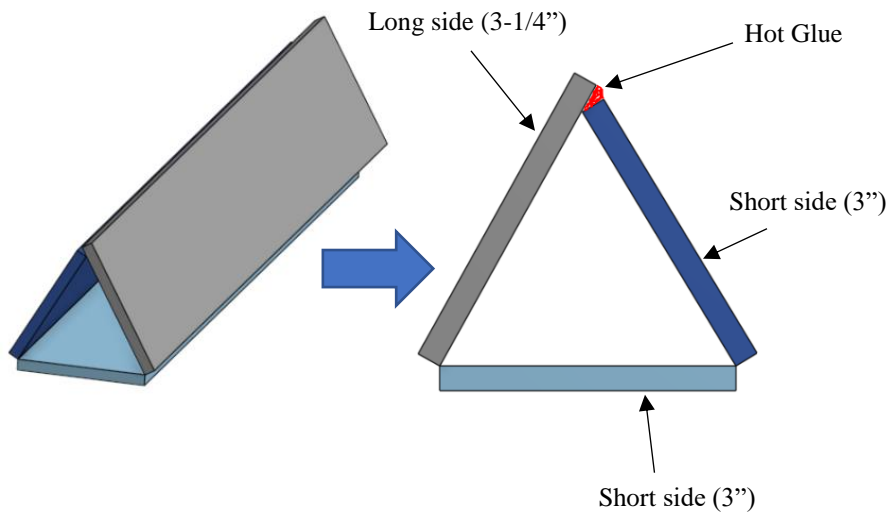
**Step #2:**  
Cut along these two lines  
(through ONE layer only!)



**Step #3:**  
Fold along one-layer cut  
lines



**Step #4:**  
Fold and glue prism



**Step #5:**  
Hot glue prism to stand so  
that there is a 1-5/8" gap

