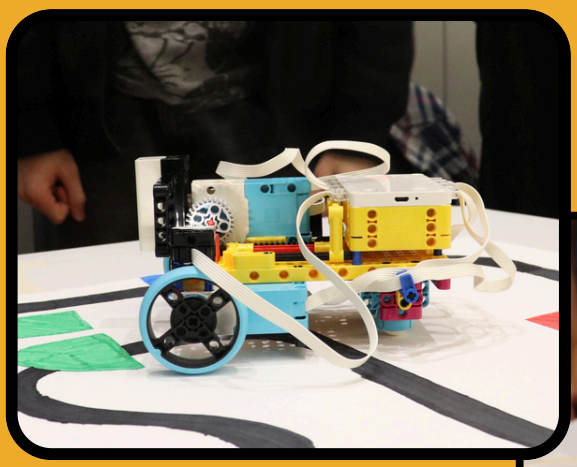
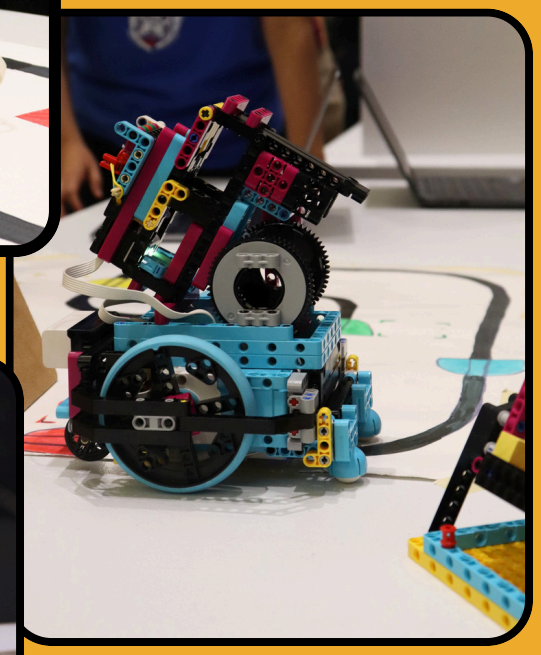
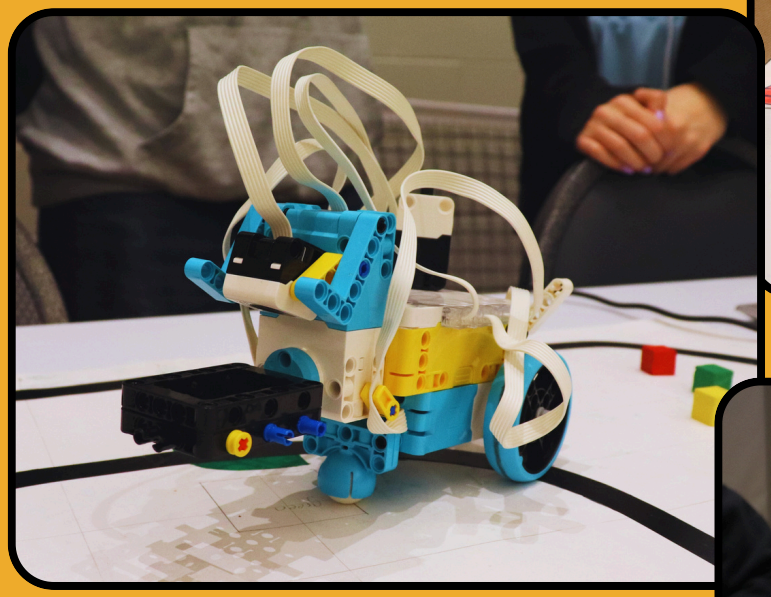
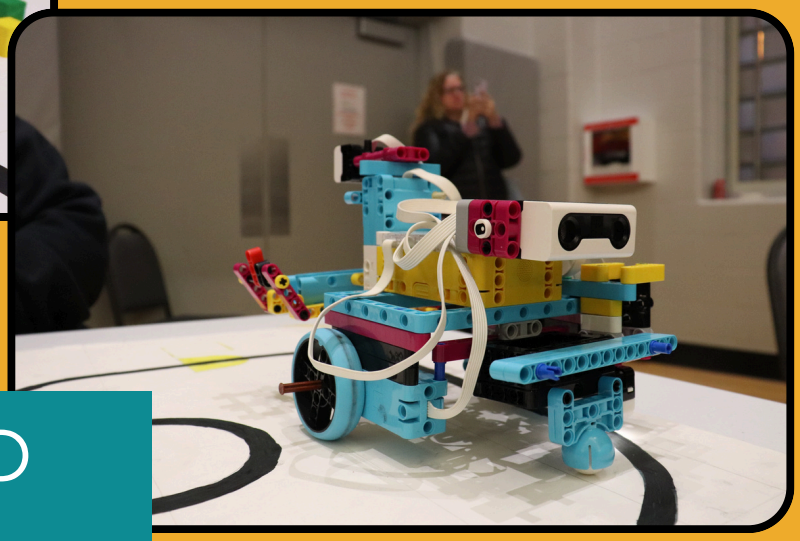








CHALLENGE AND EVENT RULES

18th Annual

OXFORD INVITATIONAL YOUTH ROBOTICS CHALLENGE

November 27, 2025

Goff Hall

381 Finkle St., Woodstock, ON

oxfordroboticschallenge.com

Contents

2025 Challenge Overview:

Figure 1 https://www.zdnet.com/article/autonomous-tractors-could-turn-farming-into-a-desk-job/

Farming continues to integrate technology into their practices, with a goal to increase efficiency and reduce errors. Specifically, autonomous farm tracker robots are being used to fertilize crops. For these machines to be effective, they need to adjust fertilizer amounts to various crops ensure safety by monitoring the environment and reacting appropriately to obstacles.

The 2025 OIYRC Challenge is inspired by this technology, and each team will design and build an autonomous farm tracker robot that will "fertilize" the different "crops" on the "farm field". The robot will have safety in mind and will stop and give a light/sound warning in the presence of an obstacle.

Skillful design and programming will ensure the robot can *efficiently* complete the task without the intervention of the team members once the start button is engaged.

Figure 2- https://www.youtube.com/watch?v=gXbJA1XD0tU

Participating teams will be evaluated on:

1. Written Report
2. Video Report
3. Robot Presentation
4. Robot Operation

Teams

- Teams may represent a school, a club or youth group.
- Teams will have at least four (4) high school aged youth members.
- Team members will receive points from all aspects of the challenge (event day, report, video).
- Teachers and adult mentors may only act in an advisory role.
- Mentor will be assigned upon availability to advise and assist the team throughout the process. These mentors volunteer their time to provide mentoring, if you are assigned a mentor you must contact them at least once to introduce the team members.
- Mentors may also provide opportunities for plant tours to view robots in an industrial environment. A team field trip to a sponsors manufacturing facility or mentor facility is strongly encouraged.

Deadlines

- **October 30, 2025** Team Registration Forms including: 1. Team name, 2. Participating student names 3. Team photo, 4. Completed photo release forms for students and teachers, 5. Media Information. Link: **OIYRC Team Registration 2025**
- **November 20, 2025** Written and Video Reports uploaded. Link will be provided.
- **November 27, 2025** Challenge Day! In-person presentation and robot operation.

Robot Design

The robot must be built with the components of the Lego Spike Kit and Expansion Kit provided. The Lego kits are provided at no cost to participating schools due to the generosity of our local sponsors. Each team will be provided with the name of their sponsoring company or organization and are expected to learn about their sponsor and proudly acknowledge their sponsor in the written report, and on the challenge day display and presentation.

Additional materials, including glue, tape, wire etc., are prohibited in the construction. The provided parts **may not** be modified including cut or drilled.

The final robot should include:

1. A *hopper*, to load the beads,
2. *Cycle Start Button* (e.g., Force Sensor or LED start button on hub)
3. *Sensors* to detect the field colour (white, red, green)
4. *Light matrix* that indicates the field colour
5. *Obstacle safety interlock* (Distance Sensor)
    - *Braking* and *sound* warning of obstacle presence
6. *Delivery system* for the fertilizer beads
7. Additional robot features (e.g., count the number of successful deliveries) awarded for points and complexity

The Robot Operation Area

On the challenge day the robot will operate on a table, the robot can operate on the table, however there may be no human intervention to prevent the robot from falling from the table.

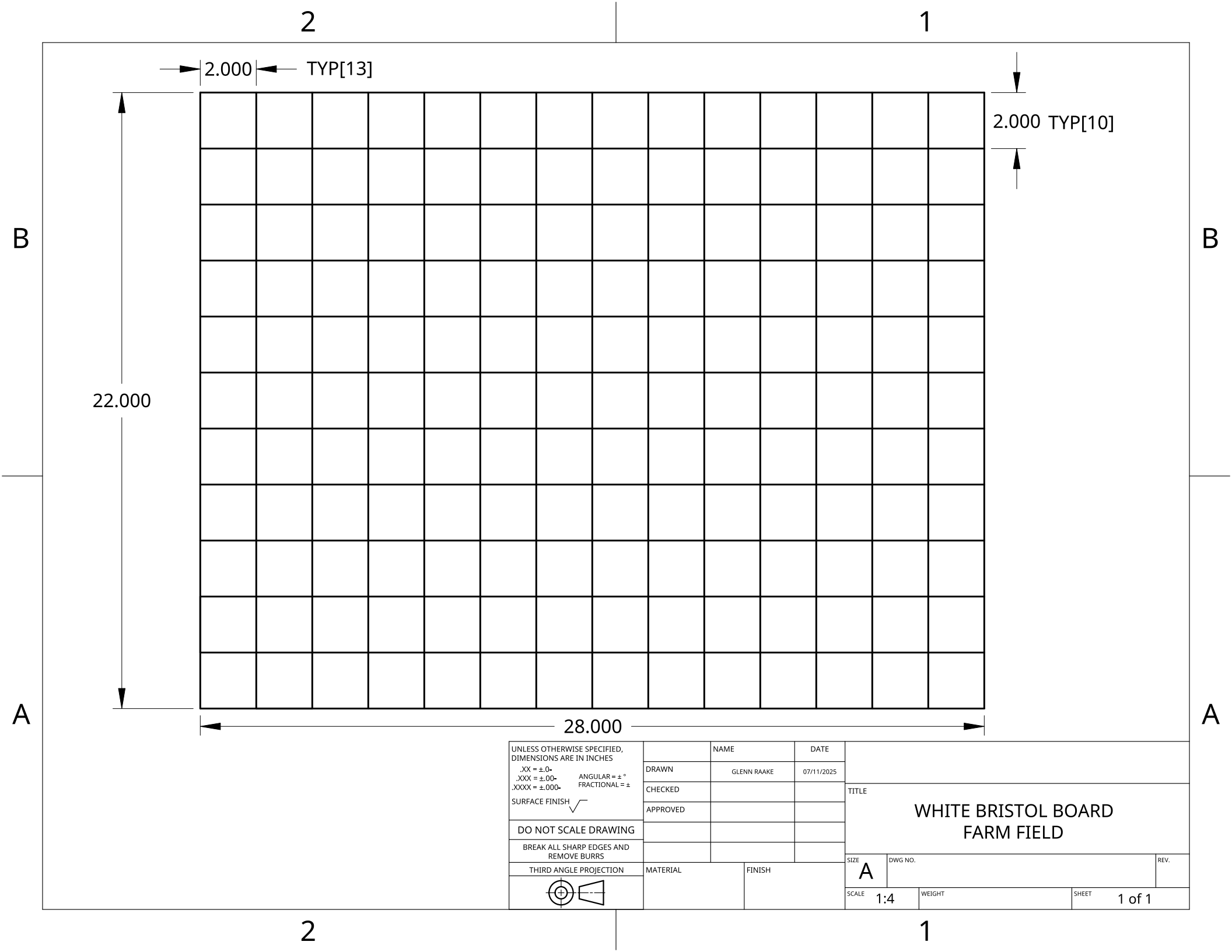
The active operating space includes:

- Table (provided)
- White field, full sheet of Bristol board (28”x22”)
- Red crop, free-moving red paper (10”x8”)
- Green crop, free-moving green paper (16”x6”)

The white field, red crop, and green crop should all include a pencil drawn 2”x2” grid. The grids must be within a +/-1/8” accuracy. The grid lines will be used to review the fertilizer delivery. These three field components are independent and separate, **do not permanently attach** the colored crops to the white field.

For each operation, the coloured crops will be placed on the white field, they will not overlap or be placed off the white field. If required, you may need to keep the crops in place with tape, but the coloured crops must be moveable. See examples of how the field may be set up on next page.

Teams are responsible for purchasing the white, red, and green Bristol boards.


2
1
2.000
TYP[13]
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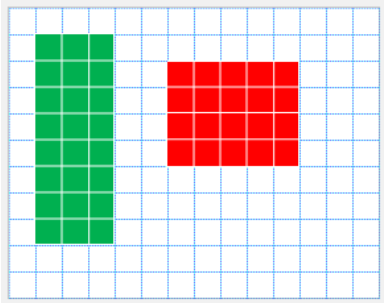
22.000
28.000
B
A
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES
.XX = ±.0-
.XXX = ±.00-
.XXXX = ±.000-
ANGULAR = ± °
FRACTIONAL = ±
SURFACE FINISH
DO NOT SCALE DRAWING
BREAK ALL SHARP EDGES AND REMOVE BURRS
THIRD ANGLE PROJECTION
NAME
DATE
DRAWN
GLENN RAAKE
07/11/2025
CHECKED
APPROVED
MATERIAL
FINISH
TITLE
WHITE BRISTOL BOARD
FARM FIELD
SIZE
A
DWG NO.
REV.
SCALE
1:4
WEIGHT
SHEET
1 of 1

GRID LINE ALIGNMENT

Green and red soil zones must align with grid lines on white farm field

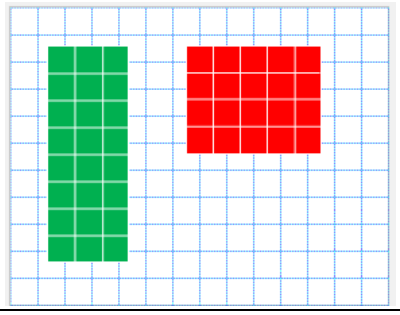
CORRECT PLACEMENT EXAMPLE

Grid of white field aligned with coloured field grids



INCORRECT PLACEMENT EXAMPLE

Grid of white field not aligned with coloured field grids

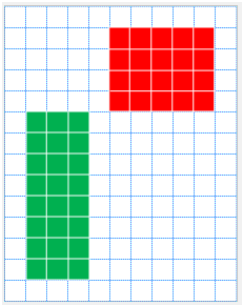


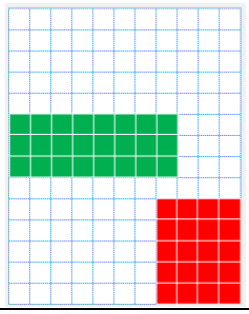
COLOURED FIELD PLACEMENT

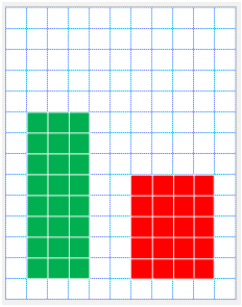
Green and red soil zones can be in any orientation and will be randomly placed by judges on the white farm field (4 examples below)

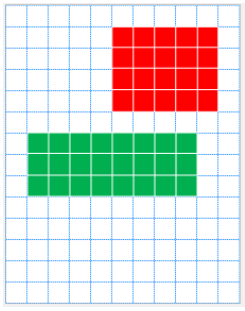
CORRECT PLACEMENT EXAMPLES

Coloured fields can be placed at any orientation on the white field



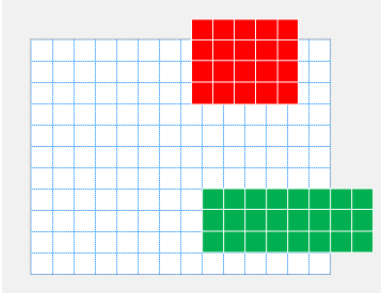




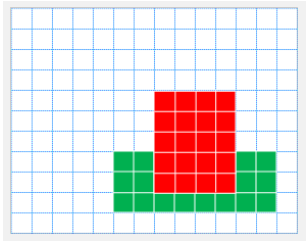


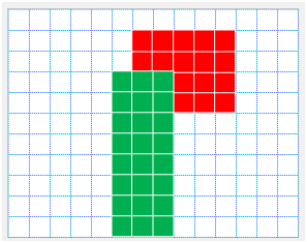
INCORRECT PLACEMENT EXAMPLES

Coloured fields must be placed on white field



Coloured fields cannot overlap





Robot Operation

The robot's hopper will be manually loaded with fertilizer (beads).

The start button will be manually pressed and will engage a programmed drive pattern. The process after the start button activation should be automated. The operation time will begin once the start button is activated. **The robot has 4 minutes to complete the challenge.**

While in operation, the robot will scan the ground, display the colour of the field on the light matrix and deliver the appropriate amount of fertilizer to each grid square based on the colour:

- White - 1 bead
- Red - 2 beads
- Green - 3 beads

The fertilizer is considered "successfully dispensed" if the fertilizer bead stays *within* the 2"x2" square once the programmed path is complete. At least ½ of the bead must be inside the grid box, at the discretion of the judges.

An obstacle safety interlock (Distance Sensor) must be incorporated into the robot design. If an obstacle (e.g., judge's hand, cow, UFO) located anywhere on the white Bristol board farm field is detected by the robot, the robot will safely brake before it collides with the obstacle, sound a warning noise, and proceed when the obstacle has been removed.

Robots are permitted to drive beyond the exterior boundaries of the white farm field to make turns and reposition themselves for each programmed path but without human intervention.

If the robot requires human intervention (e.g., the robot travels off course and a team member adjusts its direction or catches it from falling off the table) the cycle will be stopped and the timer paused. All fertilizer beads will be removed from the field, reloaded into the robot hopper, the robot will be repositioned to its starting location, and a new cycle will be started, **the timer is not reset.** The robot will only be able to use the remaining time from their 4-minute time allocation.

If the robot has not completed its drive pattern in the 4 minutes, the robot will be stopped and the scoring will commence. The time for the robot to complete the drive pattern and fertilize the field will be used in case of a tie for the Platinum award.

Challenge Scoring

The Challenge will be scored on four elements.

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

Challenge Component	Possible Score
Written Report	15
Video	15
Presentation	20
Operation	50
Final Score	**100**

The Written Report and Video must be submitted by November 20th. The Presentation and Operation of the Robot will be in-person at the Challenge Day on November 27th.

Teams will be designated Bronze, Silver, Gold, Platinum based on their scores across all challenge components.

Final scores and team ranking will be announced at the Challenge Day.

The team with the highest overall score will be the winners of the Challenge. In the event of a tied score, the most efficient robot (i.e., successfully completes the task in the least amount of time) will be awarded Platinum Level.

Submitted Items

The team must document their project from start to finish and will share the experience in a written report and video. These components are due on **November 20, 2025**. They can be uploaded using this OIYRC **Team Submission Form**. A link to the form is also available on the OIYRC Website.

Teams will lose one mark per day for late submissions.

Written Report

A written report will document your design and building process.

The report should include:

- Team Information
- Sponsoring company name, logo and description of what they do
- Mentor profile (if applicable) outlining their qualifications and how they supported the team
- Robot concept diagram
- Concepts and ideas that were attempted
- Challenges faced, achievements, successes, and learnings from the experience
- Program script

Additional points are awarded for reports that are well formatted, organized, and visually appealing.

Written Report			
Report Content **/12**	**Elements:** 1. Team information, 2. Sponsor recognition and information, 3. Mentor profile (upon availability), 4. Design concepts, 5. Process reflections, 6. Program script		
	Basic report only, missing key elements 1 2 3 4	Report including most elements 5 6 7 8 9 10 11	**Detailed** report including all elements. 12
Report Design **/3**	Unorganized Unformatted Visually unappealing	Organized Some formatting No visual aspects 1 2	Well organized Well formatted Visually appealing 3
/15			

Video

A video report documents the robots' components working prior to the Challenge Day. The video is limited to 10 minutes.

The video should include:

- Team information
- Sponsor recognition
- Team members
- Robot components operating as per the design details
- The workspace

The video should refrain from artificially generated content.

Video			
Video Content /12	**Elements:** 1. Team Information, 2. Complete Team, 3. Sponsor Recognition, 4. Robot components operating (start, dispensing, safety system, light matrix, additional features), 5.The workspace		
	Missing most key elements **1 2 3**	Includes most elements Individual components of robot shown operating **4 5 6 7 8 9 10 11**	Includes all elements Robot assembled and components shown working in one continuous take. **12**
Video Composition /3	No structure or flow Over 10 minutes Information shared is irrelevant or not explained Gimmicks, generated content is included	Organized content with good flow Some unnecessary information **1 2**	Organized and simple to follow Includes only relevant information No gimmicks or generated content. **3**
/15			

The Challenge Day

The Challenge Day is November 27th at Goff Hall in the Reeves Community Complex at 381 Finkle Street in Woodstock. Teams that are not present on the Challenge Day will be disqualified and are required to return the Lego kit in its entirety.

The order of participation is based on arrival times. Teams are allocated spots on a first come basis. The Judging will commence, and the Presentation and Visual Display will be scored before the Operation Scoring.

Presentation

The presentation is limited to **5 minutes**. The presentation should include:

- Team introduction
- Sponsors and mentors acknowledgement (if applicable).
- Highlights and lessons of the process
- Robot components explained

The presentation will also include a visual display. The display should include:

- Team Information
- Sponsoring company/organization named and logo
- Visual elements and highlights of the robot design
- Robot Kit and all elements

Additional considerations are made for displays that are well formatted, organized and visually appealing.

Presentation			
Oral Presentation /10	**Elements:** 1. Team Information, 2. Sponsor Recognition, 3 Mentor Recognition, 4. Process explained, 5. Robot elements described, 6. Team Member Participation,		
	Lacks preparation and structure Elements are missing Time runs over 5-minute limit. **1 2 3**	Well prepared and structured presentation Includes most elements. **4 5 6 7 8 9**	Presentation is polished and smooth. All members participate in the presentation **10**
Visual Display /10	**Elements:** 1. Sponsor and Mentor Recognition, 2. Robot assembled, 3. All kit components accounted for, 4. Table and display organization, 5. Visual elements		
	Robot kit is present in its entirety. Sponsor name and logo identified Table and display unorganized **1 2 3**	Most Elements included Table and display is well designed and organized **4 5 6 7 8 9**	All elements included Visuals and photos used effectively. **10**
/20			

Accuracy Calculation		
White 2" X 2" Square	**Red 2" X 2" Square**	**Green 2" X 2" Square**
1 Bead = 1 Point 0 Beads = 0 Points >1 Bead = 0 Points	**2 Beads = 1 Points** <2 Beads = 0 Points >2 Beads = 0 Points	**3 Beads = 1 Points** <3 Beads = 0 Points >3 Beads = 0 Points
White Points: (Max 110)	**Red Points:** (Max 20)	**Green Points:** (Max 24)
Perfect score bonus: 1 point □	**Perfect score bonus:** 2 points □	**Perfect score bonus:** 3 points □
Total Correct Squares: _____ (Max 154) **Total Perfect Section Bonus: _____(**Max 6)		
Score = (Total Correct Squares) ÷ 7) + Bonus for completed colours		**Score = _____** (maximum score 28)

Robot Operation			
Accuracy	<50% of the squares have the correct number of beads **0 1 2 3 4 5 6 7 8 9 10 11 12 13**	50-75% of the squares have the correct number of beads **14 15 16 17 18 19 20 21**	75%+ have the correct number **22 23 24 25 26 27 28**
Safety system Brakes, Sound, Restart	1 component of the safety system operates **2**	2 components of the safety system operate **4**	All components of the safety system operate **6**
Light matrix indicator	1 light matrix indicator functions **1**	2 light matrix indicators function **2**	3 light matrix indicators function **3**
Robot functionality Movement Efficiency Autonomy	Stilted movement Path is random and misses areas Some unnecessary stops Limited human intervention **1**	Continuous movement Path has some redundancies or omissions Some unnecessary stops No human intervention **2 3 4 5 6**	Smooth continuous movement Path is efficient No unnecessary stops No human intervention **7 8**
Additional features	None	Details: **1 2 3**	Details: **5**
/50	**Tie Breaker - Time: _____(Seconds)**		

Important Information

1. Each team must be present at Goff Hall for the Challenge on November 27, 2025 Any team that misses the event will be disqualified and are required to return the Lego kit in its entirety.
2. The robot should be conceived, designed, and built by the students with teachers and mentors acting in an advisory capacity only.
3. Team Information including Team name, Media Releases and Team Photos are due October 30th, 2025. Upload the information here: **OIYRC Team Registration 2025**
4. A written report and video are due November 20th, 2025. Upload the files here: **Team Submission Form**
5. Please refer to the website as needed. **https://oxfordroboticschallenge.com/**
6. All questions regarding the video, written report, etc. should be directed to Jane Kempe at jane@workforcedevelopment.ca
7. All questions regarding tech support (i.e., the robot and/or challenge) should be emailed to Glenn Raake at graake@ldcsb.ca

Most importantly, enjoy the process and good luck!