RULEBOOK

FOR THE CRC ROBOTICS JUNIOR COMPETITION

TAK TIK JR 2025

A program of

AEST EAST

ALLIANCE POUR L'ENSEIGNEMENT DE LA SCIENCE ET DE LA TECHNOLOGIE
EDUCATIONAL ALLIANCE FOR SCIENCE AND TECHNOLOGY

Version 1.0

Table of Contents

General Rules

The CRC Junior TakTik 2025 Competition will take place on February 21st, 2025 at St. Pius X Career Centre.

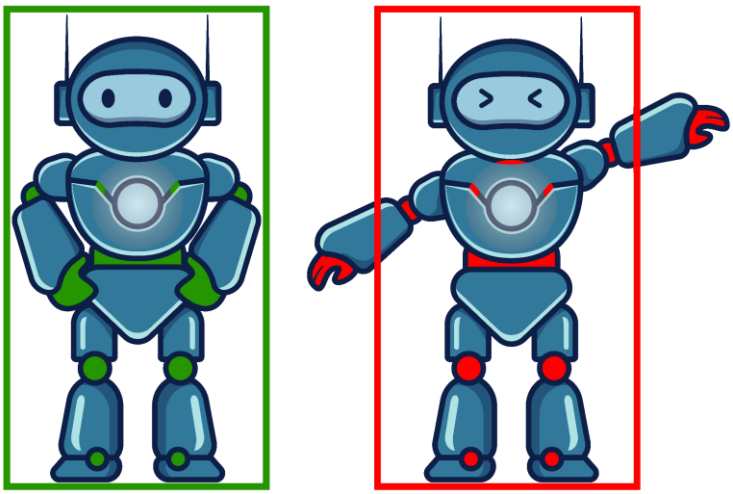
The Competition includes four (4) distinct components: two (2) different robot challenges, a mystery robot challenge (revealed on January 13th, 2025) and a kiosk presentation. Your overall ranking is determined by adding together your performances in all four (4) components.

- Your team, upon arrival, shall be assigned to one of three (3) challenge groups.
- Each challenge group will rotate through the available challenges based on a set schedule.
- Teams within the challenge group must queue to be permitted to attempt their assigned challenge.
- It is the responsibility of teams to participate in the challenge assigned to them.
- An attempt timer of two minutes shall begin when teams are instructed to start their robot by a Game Official.
- There is no limit to the number of attempts a team may make within their assigned challenge.
- Only the best attempt in a challenge shall be used for the team's ranking.
- Teams must assign themselves to a kiosk evaluation slot, on arrival.
- Slots are attributed on a first come first serve basis.

Additional details available within the information booklet.

Robot Constraints

- Robots shall be controlled by one of these LEGO® series **controllers**: Spike, EV3 or NXT.
- The robot must have a single button that will allow the robot to start moving. The buttons on the **controller** are permitted.
- The maximum voltage of a robot's **controller** is 10 Volts.
- **When fully extended**, your robot must fit in a 250 mm x 250 mm x 320 mm (height) box.



- When not queuing up or making an attempt, modifications to the build and programming of your robot are permitted.
- You may use the same robot, a modified one, or a completely different robot for each attempt.

Challenge #1 – Tractor Actor

Goal

The main objective is to calculate the distance between the **wall** and the weighted **sled** while dragging it.

Making an Attempt

Start: Your robot shall be placed in the starting square.

Game Flow: Your robot shall attach to and pull the weighted **sled.** Your robot must measure, and display the distance in millimetres separating the **furthest forward portion of the sled's body** to the **back wall**.

End: The attempt shall end once your robot ceases movement, touches the **back wall** (behind the **ramp**), or once the attempt timer runs out.

Playing Field

- The playing field consists of a flat track enclosed on three (3) sides by 305 mm high walls.
- A **ramp** extending the width of the field is placed on the field.
- Both inclines for the **ramp** are angled at 5°.
- The **sled** is placed in its own starting square.
- If utilised, an ultrasonic sensor may only face towards the challenge's lateral walls.
- The omission of certain measurements in the technical drawings of this challenge is purposeful.

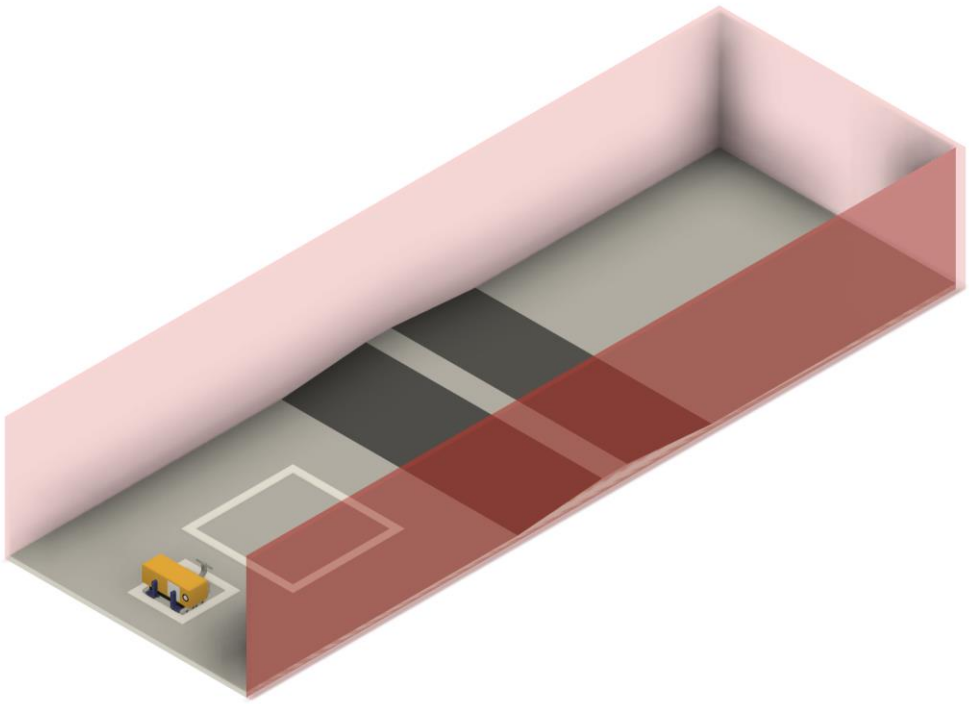
Sled Specifications

- The **sled** shall be constructed from kit pieces as described in the technical documentation.
- During the challenge, the **sled** shall contain a full 200 ml standard Oasis or Compliments juice box without the straw and/or its wrapper attached.

Scoring

Scoring shall be based on the most accurate overall distance measured (± 1 mm) between **the furthest forward portion of the sled's body to the back wall.** Should two teams achieve the same final measurement in millimetres the team with the lightest robot (± 1 g) shall be ranked higher in scoring.

Field Example



Challenge #2 – Search and Rescue

Goal

The main objective is to **complete** as many **tiles** as possible in the least amount of time. The secondary objective is to transport **collected golf balls** to the **rescue tile**.

Making an Attempt

Start: Your robot shall be placed on the starting **tile**.

Game Flow: The robot shall follow the **path** through each **tile**. There are multiple **tiles** with different levels of difficulty. The robot has to stay on course throughout the challenge. There will be **golf balls** on the **path**. They shall be transported to the end of the challenge onto the **rescue tile**.

End: The attempt shall end once the entire robot is fully inside the **rescue tile**, or once the attempt timer has reached the 2-minute limit.

Playing Field

- The field consists of 16 predetermined 305 mm by 305 mm **tiles** placed in a random 4 x 4 arrangement indicated in the top-down view below.
- Intersections are indicated by **intersection circles**.
- A green **intersection circle** indicates a required 90° right turn.
- A red **intersection circle** indicates a required 90° left turn.
- **Tiles** are scored as **completed** once a robot moves to the next **tile** by following all the required **intersection circles**.
- Teams may choose to continue despite not having **completed** the preceding **tile**.
- The first **tile** of every **section** is a **checkpoint**.
- A robot is **off course** if a team or Game Official determines it to be.
- In the event of an **off course** robot, the course shall be resumed from the robot's last **checkpoint** reached. The timer does not pause during this event.

- Your team may place a maximum of one **golf ball** per **section**. Placing a **golf ball** on the **rescue tile** is not permitted.
- **Golf balls** displaced from their original position and controlled by the robot shall be considered **collected**.
- **Collected golf balls** shall be moved with the robot in the event of an **off-course** robot's path being resumed.
- In the event that a robot interacts with a **golf ball** and fails to **collect** it, the **golf ball** shall remain in its resting position. These may be retrieved later.

Scoring

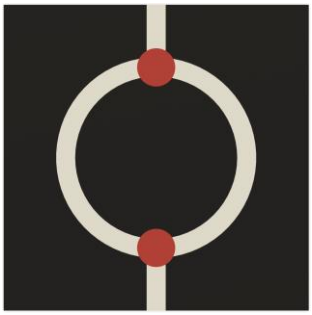
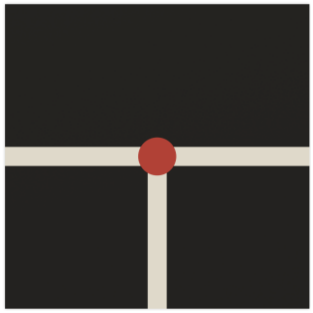
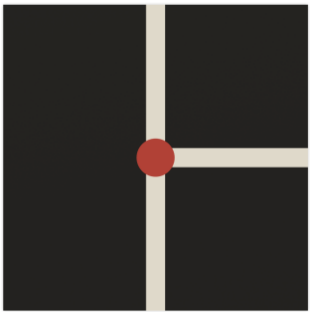
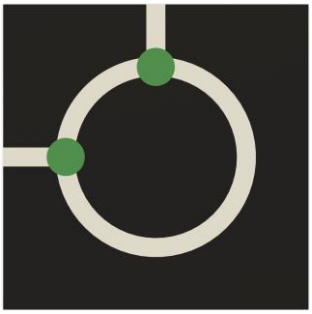
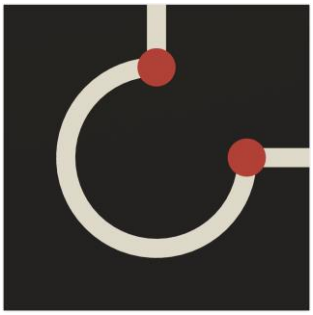
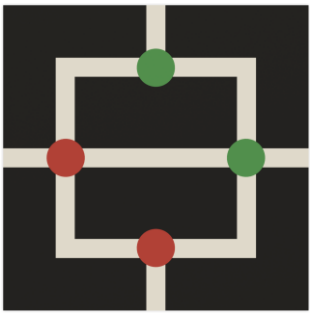
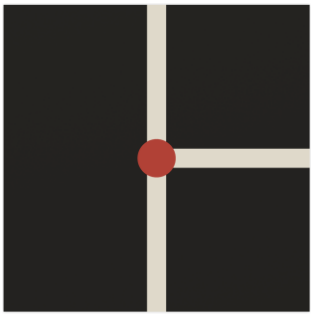
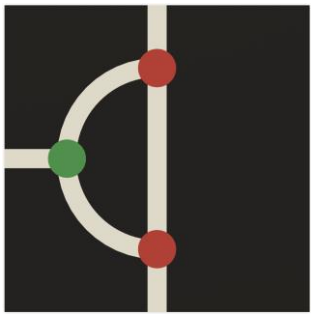
- Every **completed tile** is worth a specific number of **points**.
- Every **collected golf ball** at the end of the attempt is worth 20 points. They are worth 30 additional points if they are carried to the **rescue tile**.
- Every second left once the robot reaches the **rescue tile** is worth 2 points.

Paths

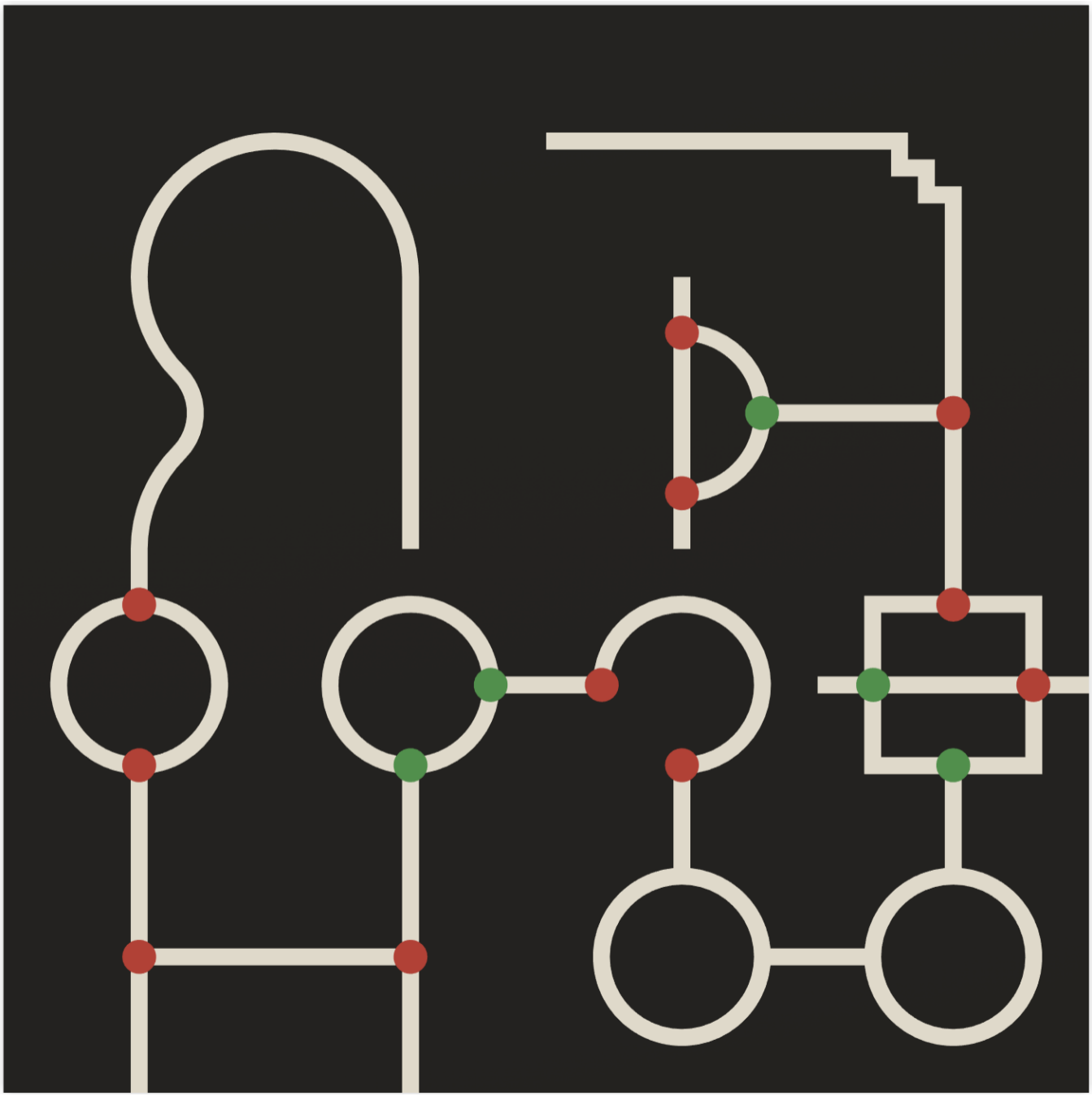
- All **paths** on the **tiles** consist of a 19 mm wide white **line**.
- The outer radii of circular **paths** are 100 mm, with the exception of the two (2) quarter circle **paths**.
- **Intersection circles** are 38 mm in diameter.

Tiles

The playing field shall be an arrangement of the following **tiles**. They are grouped horizontally into ordered **sections** of four (4) **tiles**, in a randomly assigned pattern.

 **Start Tile**	 **5 points**	 **5 points**	 **10 points**
 **25 points**	 **20 points**	 **20 points**	 **25 points**
 **20 points**	 **15 points**	 **15 points**	 **35 points**
 **20 points**	 **30 points**	 **15 points**	 **Rescue Tile**

Field Example



Kiosk

The Kiosk component requires the creation of a themed space and presentation to visitors and judges.

Provided Material

- 1 folding table
- 2 chairs

Constraints

- The presentation shall last no longer than 5 minutes.
- A 5-minute question period shall follow the presentation.
- Any and all visual aids must be bilingual.
- Presentations may be in either language, however, students must be prepared for questions in either language.
- The kiosk must be identified with the school and team name.
- The presentation may be given by any number of students.
- The kiosk and the team must be respectful of neighbouring kiosks.
- The team must be ready to present in their selected time slot.
- No major modification shall be permitted on site.
- Any cleaning costs incurred by the host school due to non-respectful behaviour shall be invoiced to the offending team. Repeat offenders may be subject to further penalties.

Kiosk Evaluation Form

Kiosk Construction					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Layout	The layout is cluttered, confusing, and makes it difficult to navigate.	The layout is somewhat organized but lacks flow, making navigation awkward.	The layout is clean and well-organized, allowing for easy navigation.	The layout is exceptionally clear, intuitive, and efficiently uses space, making it very easy to navigate.	
Visitor Engagement	The kiosk fails to capture visitors' interest, with little to draw them in or hold their attention.	The kiosk captures some interest, but engagement is inconsistent or limited to a few visitors.	The kiosk effectively engages visitors, maintaining their interest with appealing content and activities.	The kiosk is highly engaging, capturing and holding visitors' attention with creative, interactive elements that encourage participation.	
Originality	The kiosk lacks creativity, using common or unoriginal ideas with minimal effort to stand out.	The kiosk shows some originality, but the ideas or execution are fairly standard.	The kiosk displays creativity in its approach, with some unique ideas or elements that enhance the theme.	The kiosk is highly original, incorporating unique, innovative elements that set it apart and make it memorable.	

Presentation					
	Beginning (1)	**Developing (2)**	**Accomplished (3)**	**Exemplary (4-5)**	**Score /5**
Clarity	The presentation is unclear, with key concepts difficult to understand and explanations vague or confusing.	The presentation communicates the basic ideas, but some parts are unclear or lack sufficient detail.	The presentation is clear and understandable, with minor areas that could be better explained.	The presentation is exceptionally clear, with all concepts well-articulated and easy to understand.	
Organization	The presentation is poorly organized, making it difficult to follow the flow of ideas.	The presentation has a general structure, but the flow of ideas is sometimes disjointed or lacks a smooth progression.	The presentation is well-organized, with a logical progression of ideas, though some transitions could be smoother	The presentation is extremely well-organized, with a logical and engaging flow of ideas that enhances understanding.	
Response to questions	Struggles to answer questions effectively, with responses lacking depth or relevance to the questions asked.	Answers questions with basic understanding, though responses may be incomplete or somewhat unclear.	Responds to questions with clear, thoughtful answers that demonstrate good understanding of the topic.	Provides detailed, insightful answers to questions, demonstrating a deep understanding and ability to think on the spot.	

GENERAL RULES

cheat sheet

SETUP

Place your robot in the starting position, then press the button to start your program and let your robot do the work!

Once your program starts, you cannot touch your robot until the referee says so.

TIMER LIMIT

2 min

You will have **2 minutes** for each attempt. You will have enough time to take two or more attempts, depending on how filled the challenge's queue is.

HOT TIP

Almost everything has already been done by someone kind enough to share the knowledge on the Internet. By using the right keywords, you should find what you are looking for!

HOW TO WIN

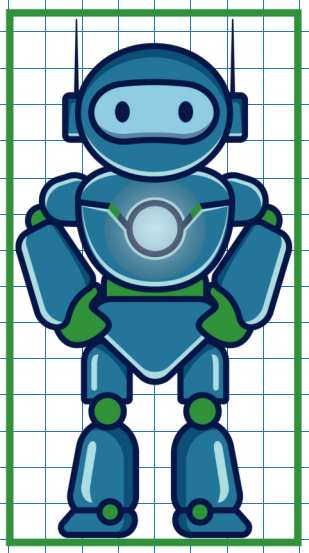
Look for the **winning condition** for each challenge. In the event of a tie, a second condition may determine the better robot.

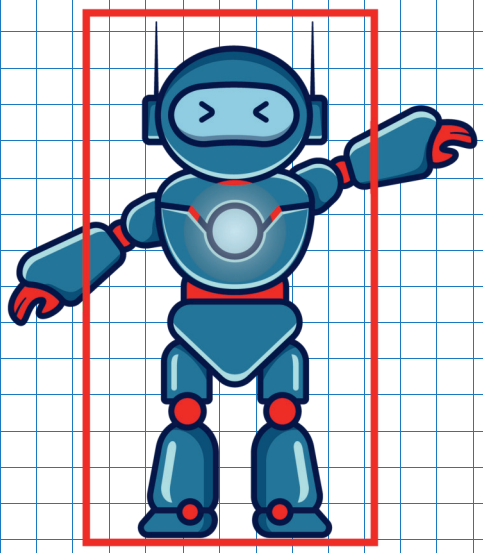
THINK OF:

- [ ] The simplest way to win
- [ ] Which sensor(s) to use
- [ ] Where to place the sensor(s)
- [ ] Improving performance
- [ ] Writing down your progress

DIMENSIONS

Every part of your robot, **including moving parts**, must fit in a 250 mm x 250 mm x 320 mm high box.





TRACTOR ACTOR

cheat sheet

CHALLENGE

A sled has a **full** 200 ml juice box on it. Make your robot **take and pull the sled** over the hill and touch the back wall.

Your robot should **display the distance** separating the sled and the wall, including the hill incline.

The most accurate measurement displayed wins. In the event of a tie, the lightest robot wins.

MY ROBOT CAN:

- [ ] Pull the sled
- [ ] Measure distances travelled
- [ ] Get over the small hill
- [ ] Calculate the distance **in mm**
- [ ] Display the distance **in mm**

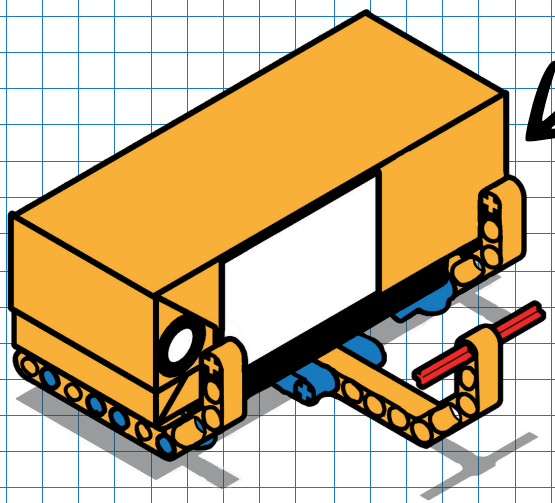
HOT TIPS

Don't forget to **add in the length of your robot**.

Each wheel rotation is equal to a distance travelled... As long as your wheels are not slipping!

SPECIAL RULE

Your distance sensor may only face the lateral walls. You may use it to help your robot position correctly.



THE SLED

Ask an adult for the plans to build your own. **Don't drink the juice**, you need the weight of a **full juice box**!

SEARCH & RESCUE

cheat sheet

CHALLENGE

Make your robot **follow the line** and navigate the **intersections** of the **16 tiles**.

There are up to **4** golf balls on the field. Bring them to the **rescue tile** for extra points.

The most points scored wins! Time left is worth additional points.

MY ROBOT CAN:

- [ ] Follow the white line
- [ ] Turn left at red intersections
- [ ] Turn right at green intersections
- [ ] Collect up to 4 golf balls
- [ ] Finish quickly

HOT TIPS

Your **color sensor** should see one of four colors: red, green, black or white. For each color, your robot turns in a certain direction to follow the path.

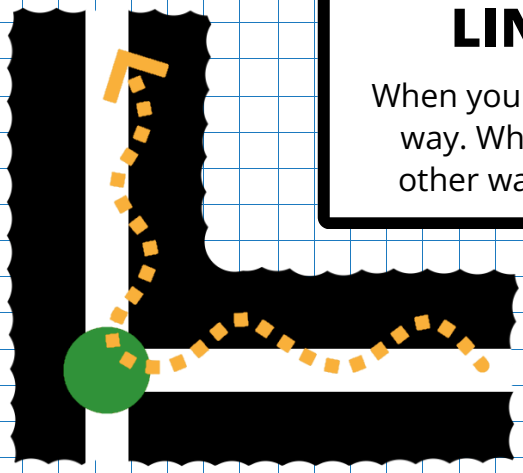
The way in which you bring the golf balls to the rescue tile doesn't matter.

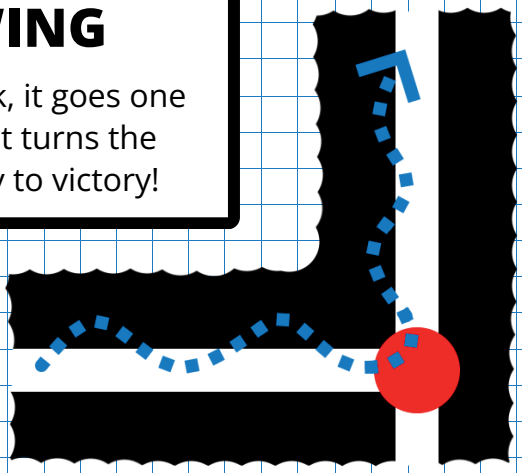
SPECIAL RULE

Place to 4 golf balls on the field before making your attempt.

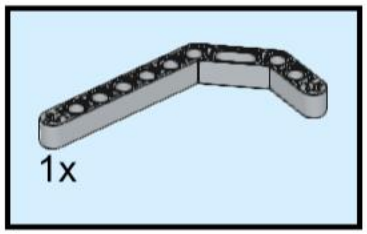
LINE FOLLOWING

When your robot senses black, it goes one way. When it senses white, it turns the other way. Waddle your way to victory!

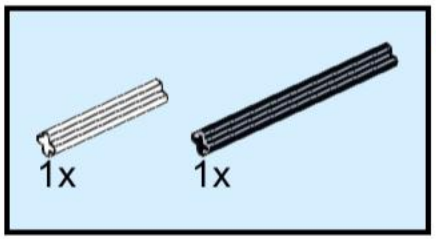




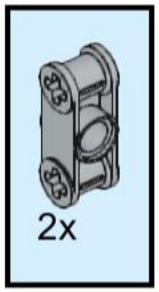
1

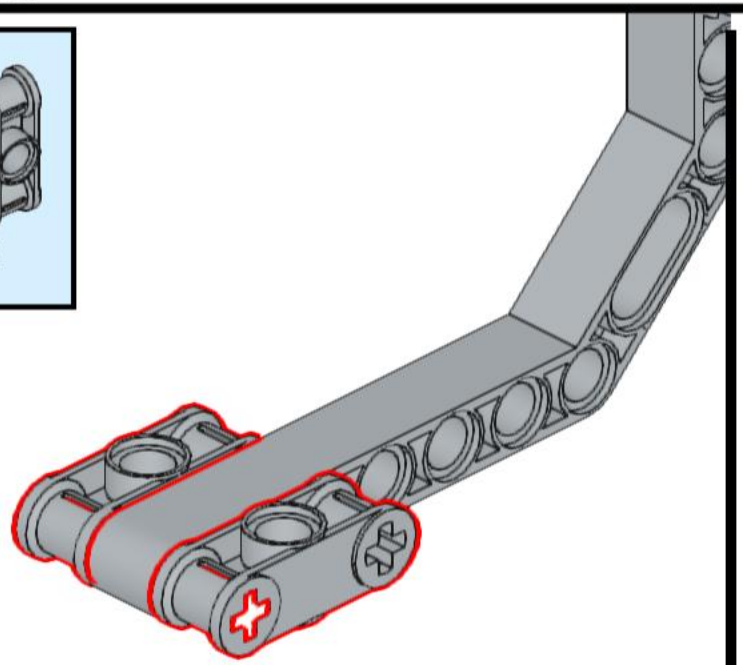


2



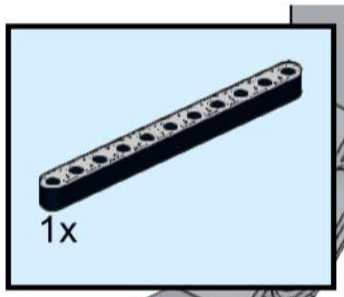
3

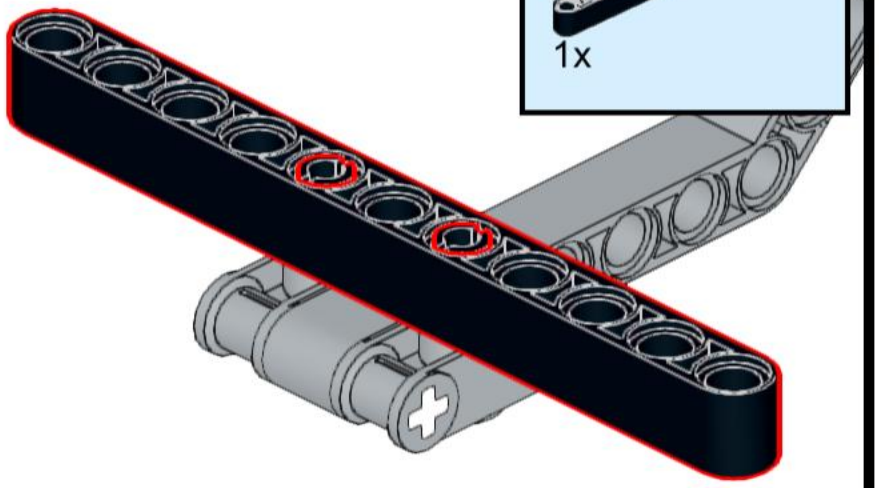




4

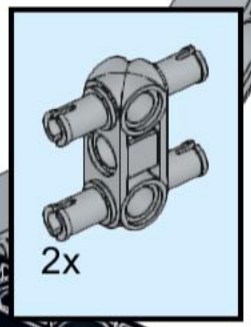
5



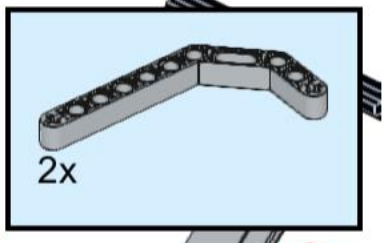


6

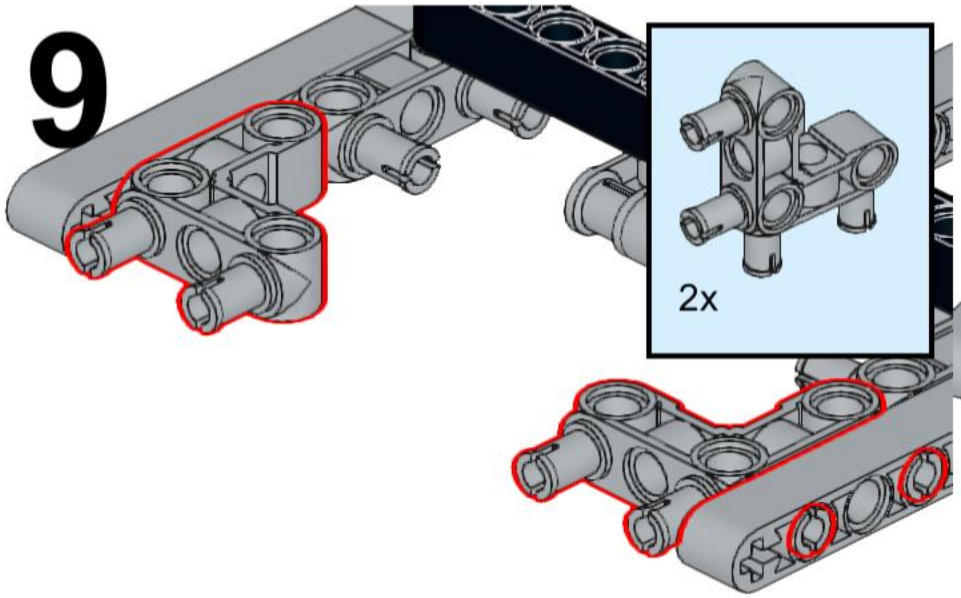
7



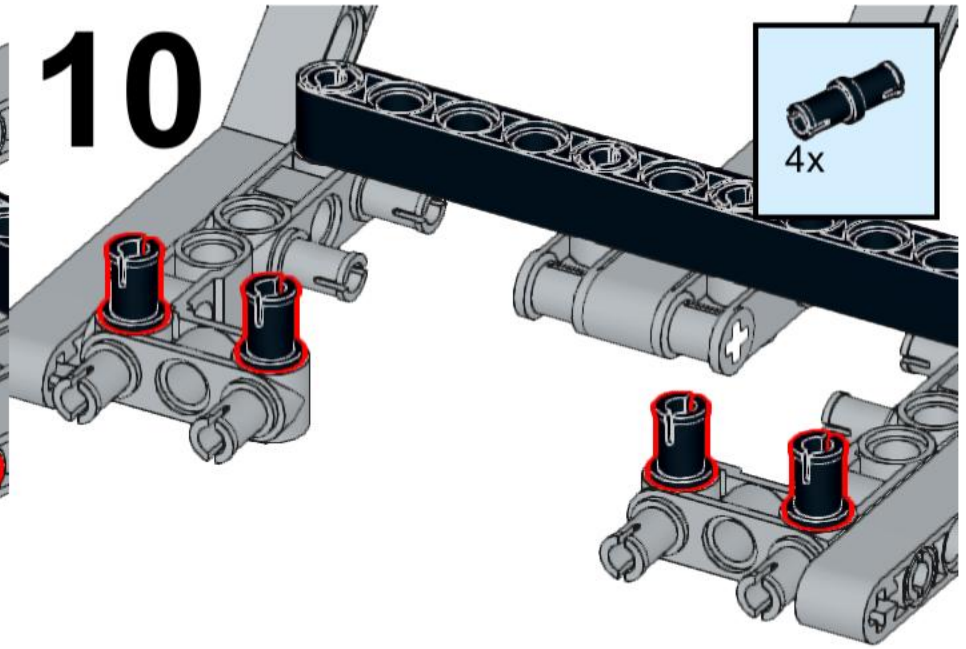
8



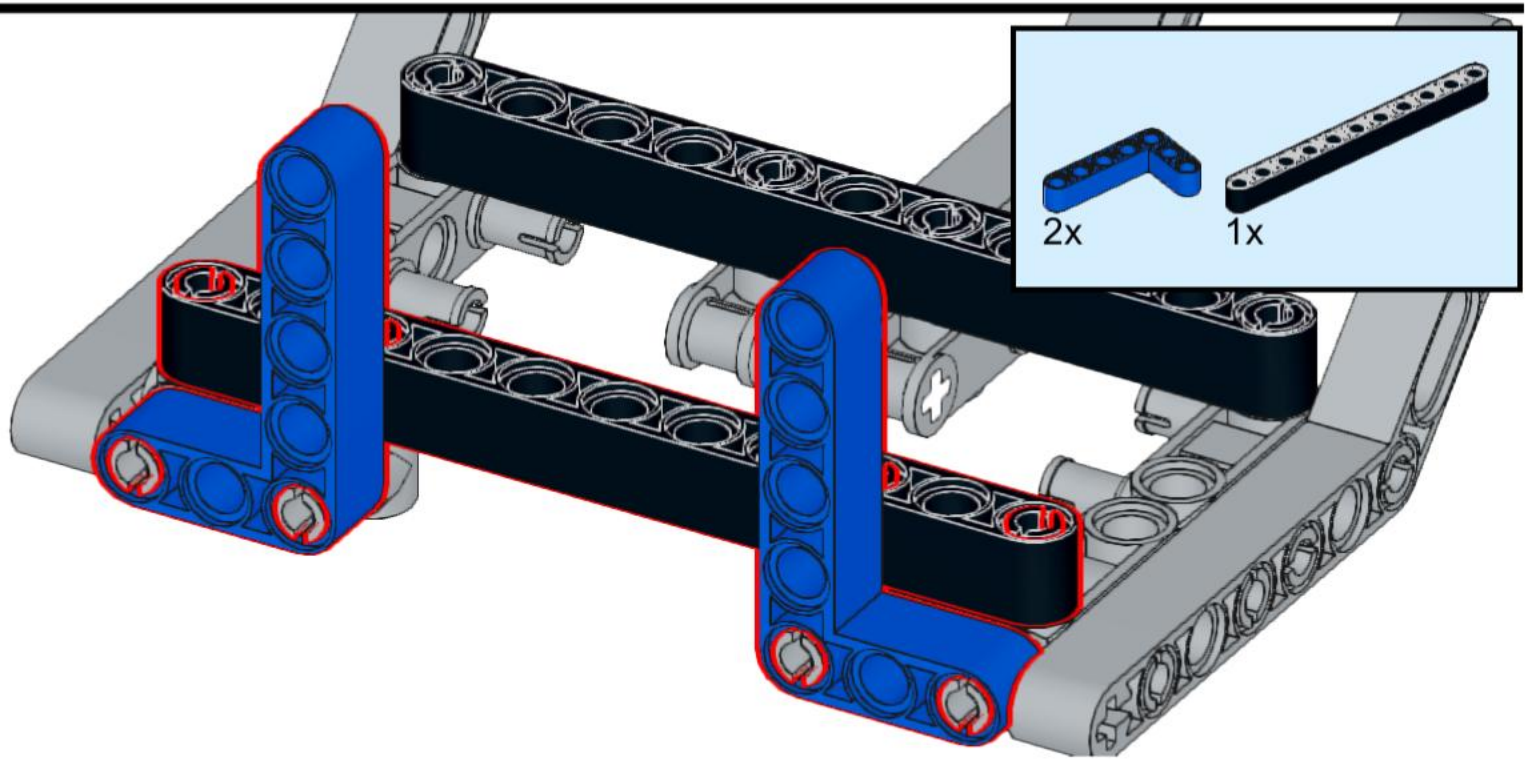
9

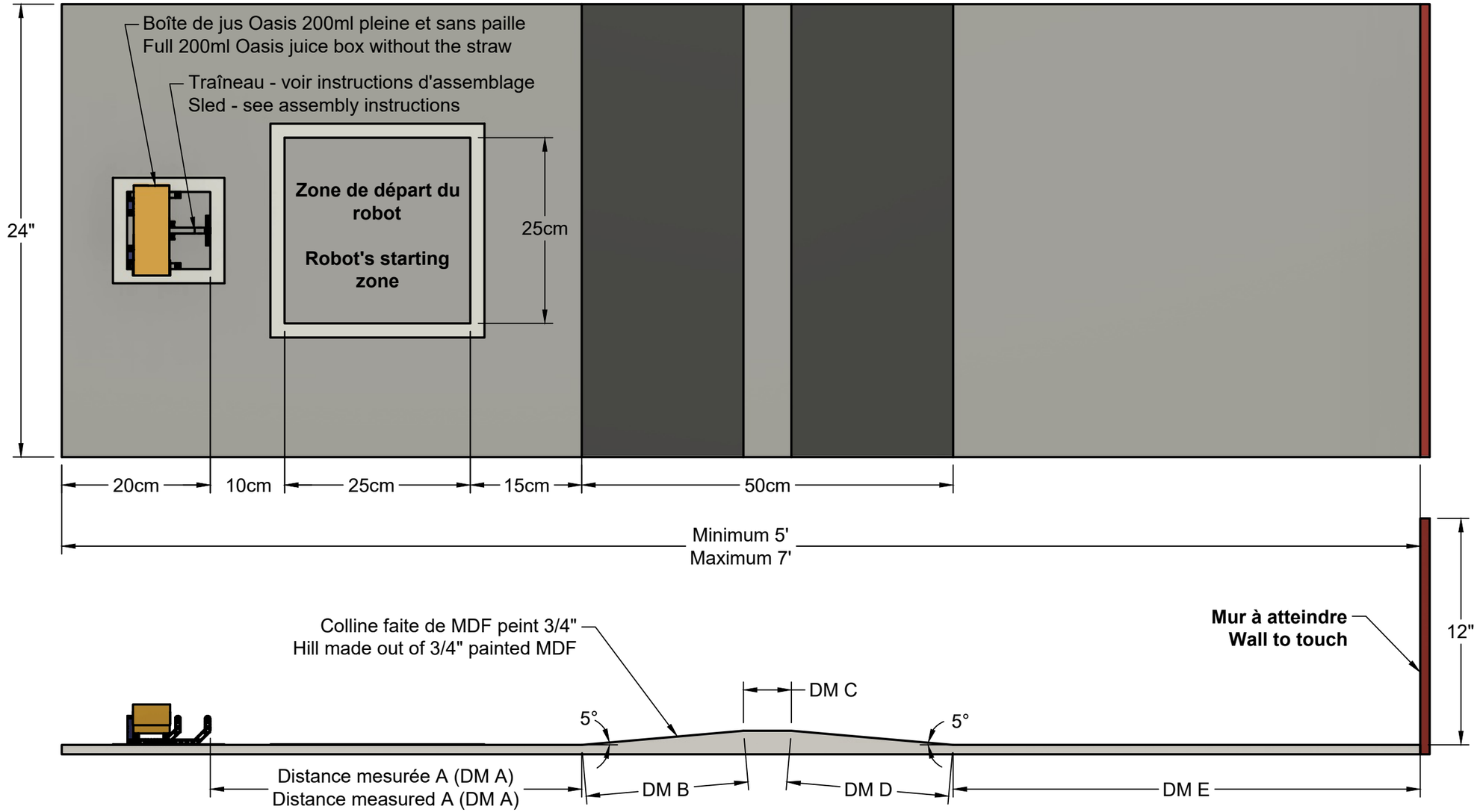


10



11





NOTES:
La distance à mesurer est la distance entre le devant du traîneau et le mur.
Distance à mesurer = (DM A) + (DM B) + (DM C) + (DM D) + (DM E).
Le terrain est entouré d'un mur externe de 12" de hauteur fait de contreplaqué 1/2" peint en rouge.
Les zones de départ pour le robot (25cm x 25cm) et du traîneau sont centrées sur la piste.

The distance to measure is the distance between the front end of the sled and the wall.
Distance to measure = (DM A) + (DM B) + (DM C) + (DM D) + (DM E).
The field has a 12" high external wall made of 1/2" plywood painted in red.
The starting zones for the robot (25cm x 25cm) and the sled are centered on the track.

Robotique CRC Robotics

JEU | GAME
TAKTIK 2025 JUNIOR

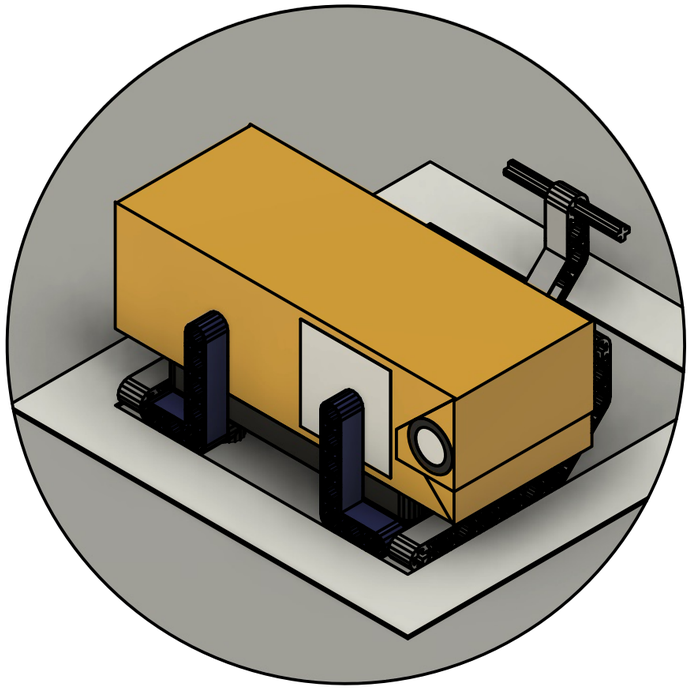
TITRE | TITLE
TRACTEUR ACTEUR
TRACTOR ACTOR

ROBOTIQUE CRC ROBOTICS
mathieu.robitaille@sciencetech.ca
SIGNATURE Mathieu Robitaille 2024-09-15

CODE	NOM DU FICHIER | FILE NAME	PAGE
TAKTIKJR_1	Tractor Actor Field.PDF	1/2

1:6

Vous éprouvez des difficultés? Demandez de l'aide! Having a hard time? Ask for help!



DETAIL A

Robotique CRC Robotics

JEU | GAME

TAKTIK 2025 JUNIOR

TITRE | TITLE

TRACTEUR ACTEUR
TRACTOR ACTOR

ROBOTIQUE CRC ROBOTICS
mathieu.robitaille@sciencetech.ca

CODE	NOM DU FICHIER | FILE NAME	PAGE
TAKTIKJR_1	Tractor Actor Field.PDF	2/2

SIGNATURE Mathieu Robitaille 2024-09-15 | 1:5 | *Vous éprouvez des difficultés? Demandez de l'aide! Having a hard time? Ask for help!*