



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 1.1

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General Rules

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

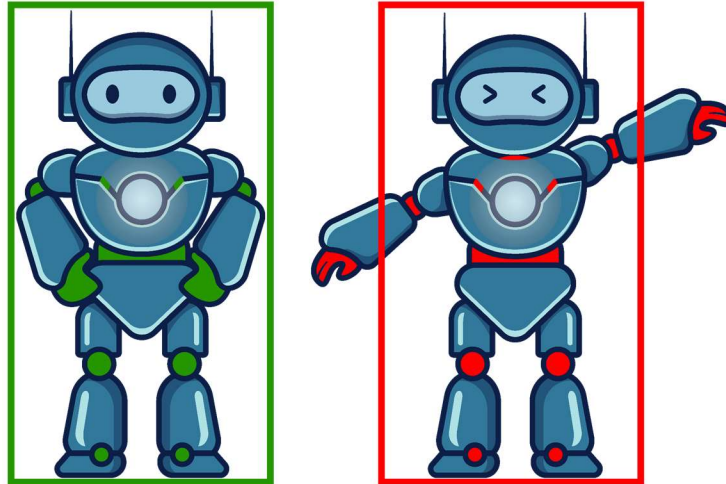
The Competition includes 4 distinct components: 2 different robot challenges, a mystery robot challenge (revealed on January 13th, 2025) and a kiosk presentation component. Your overall ranking is determined by adding together your performances in all 4 components.

- 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. Buttons on the **controller**.
- The maximum voltage of a robot's **controller** is 10 Volts.
- Your robot must not exceed 320 mm in height and must fit **fully extended** in a 250 mm square.



- In between matches, 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 challenge.

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 on the starting square.

Game Flow: Your robot shall connect 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.

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.
- This **ramp** consists of two 5° inclines with a plateau between them.
- 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.

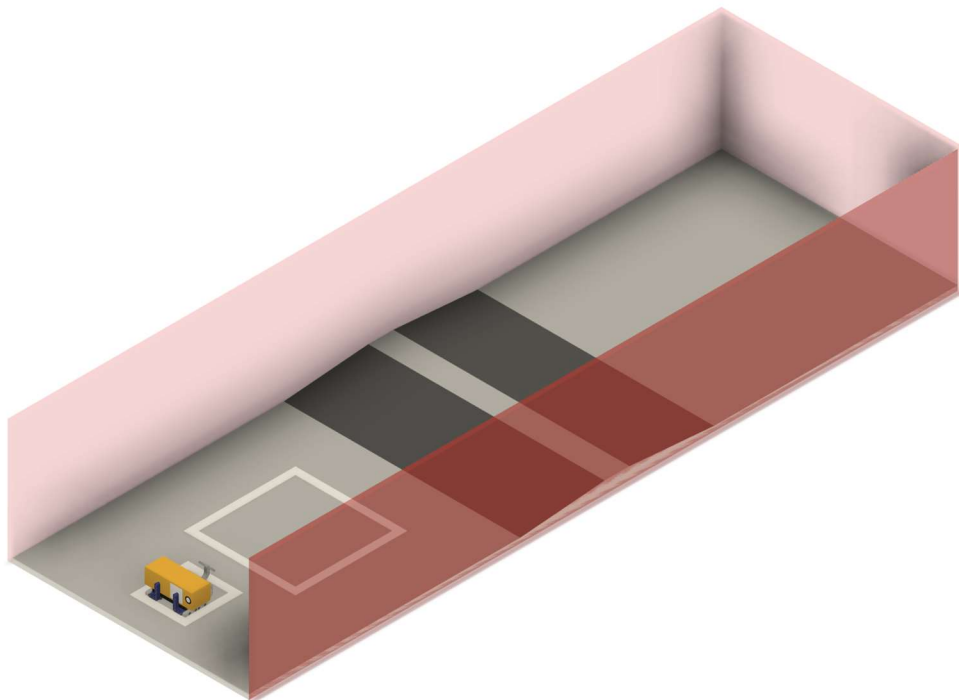
Sled Specifications

- The **sled** must be constructed from kit pieces as described in the technical documentation.
- During the challenge, the **sled** must 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.

Search and Rescue 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 above.
- 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 tile**.
- 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 completed **checkpoint tile**. 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





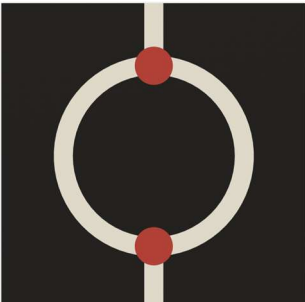
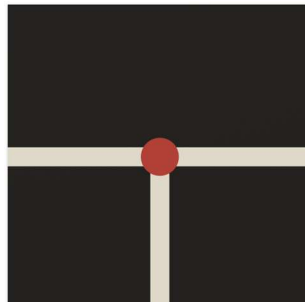
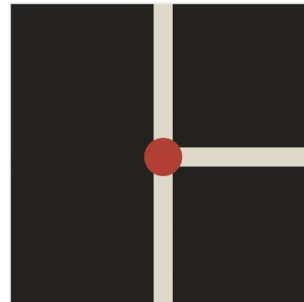
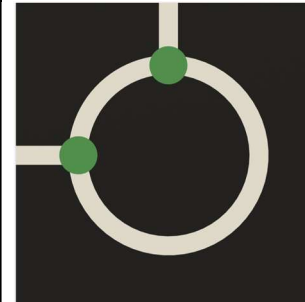
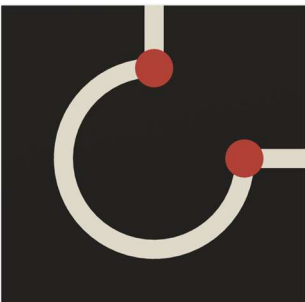
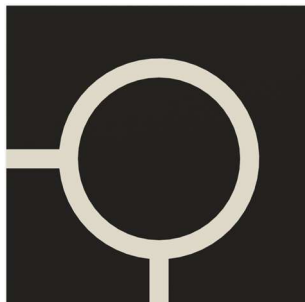
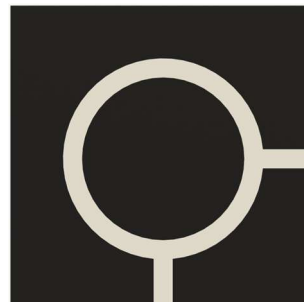
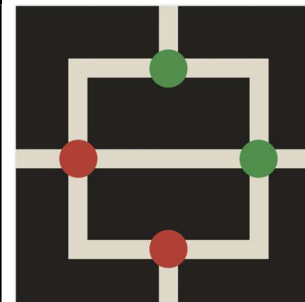
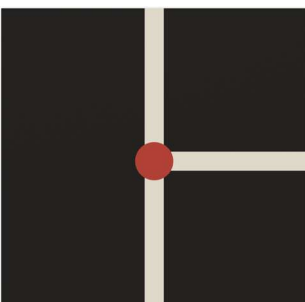
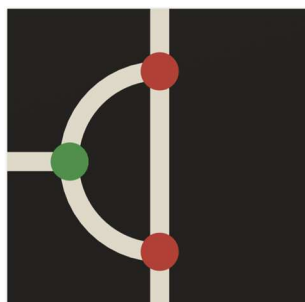


- Every **completed tile** is worth a specific number of **points**.
- Every **collected golf ball** at the end of the attempt is worth 20 points. They are worth 30 additional points if they are carried to the **rescue tile**.
- Every second left once the robot reaches the **rescue tile** is worth 2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

Paths

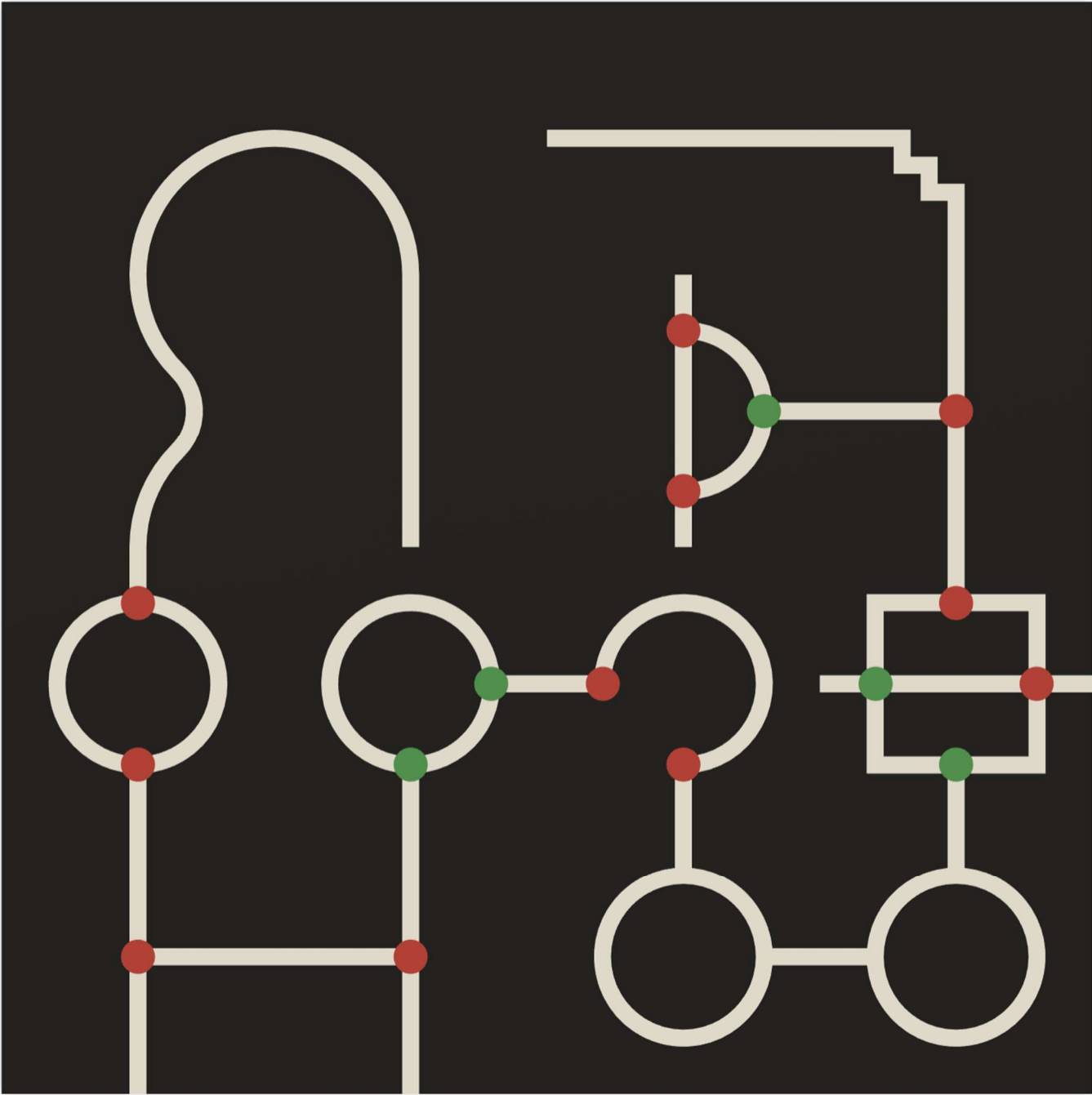
- All **paths** on the **tiles** consist of a 19 mm wide white **line**.
- The outer radii of circular **paths** are 100 mm, with the exception of the two (2) quarter circle **paths**.
- **Intersection circles** are 38 mm in diameter.

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



Mystery Challenge – Cup Conqueror

Goal

The objective is to knock all **15 cups** off a circular platform with a diameter of **100 cm** within **two minutes**.

Making an Attempt

Start:

- When the attempt timer begins, teams shall be responsible for placing the **15 cups** in the arrangement of their choosing.
- Once all **cups** are placed, the team shall activate their robot.
- Once a robot is activated, interaction with the playing field or the **cups** is forbidden.

Game Flow:

- The robot is expected to remove all **15 cups** from the platform.
- **Cups** may be removed via any non-destructive means.
- A **cup** is considered removed from the platform once its entirety rests outside of the playing fields perimeter.
- In the event that a robot exits the playing field, it may be retrieved and placed back onto the playing field at the location it fell off.
- The timer shall remain active until the end of the attempt.

End:

- The attempt ends when any of the following occur:
 - All **15 cups** are successfully knocked off the platform.
 - The two-minute timer has expired.
 - The robot remains immobile for more than 10 seconds.
 - The robot exits the playing field two (2) times.

Field

- Platform Specifications:
 - A circular platform with an outside diameter of **100 cm**.
 - The platform is a black disk
 - The platform's is encircled in a white painted perimeter **21 mm** wide.
- Cup Specifications:
 - The cups are standard 16 oz red plastic **cups**.

Scoring

- Primary Scoring:
 - The robot removing the most **cups** in the shortest attempt **time** wins
- Tiebreaker:
 - In the event of a tie, the robot that fell the least number of **times** wins.
 - If the tie persists, the lightest robot **wins**.

Kiosk

The Kiosk component requires the creation of a themed kiosk space and presentation to visitors and judges. This component gives each school an equal opportunity to showcase their school, their team and their robot.

Provided Material

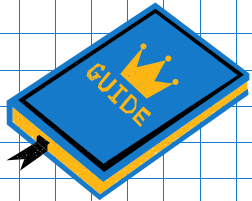
- 1 folding table
- 2 school chairs

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

Subject	Criteria
Construction and Creativity	<p>Is the kiosk’s layout optimal for a functional workspace? There is enough functional space so your team can come back to work on your robot and your code without disturbing the aesthetics of your kiosk.</p>
	<p>Is the kiosk engaging and reflective of the team’s theme? The kiosk is intriguing to the public. Students interact with the public in a respectful and friendly way.</p>
	<p>Does the kiosk surprise and amaze? The kiosk has a “wow” factor. It creatively demonstrates excellence in detail and craftsmanship.</p>
Presentation	<p>Did the team engage the audience with their journey? The team can clearly explain their inspiration and justify the process regarding the design of the kiosk, considering their expertise, team size, challenges, and limitations.</p>
	<p>Does the presentation add to the value of the kiosk? The presentation of the kiosk is creative, engaging and related to the theme of the kiosk.</p>
	<p>Is the presentation an immersive experience? The presentation generates connections facilitating the involvement of the audience as partners to the team.</p>



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

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.

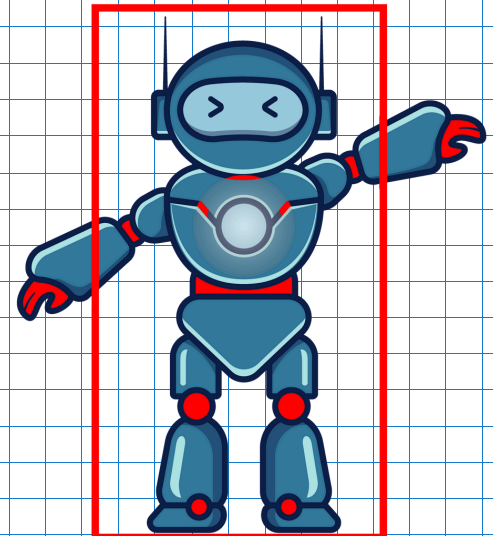
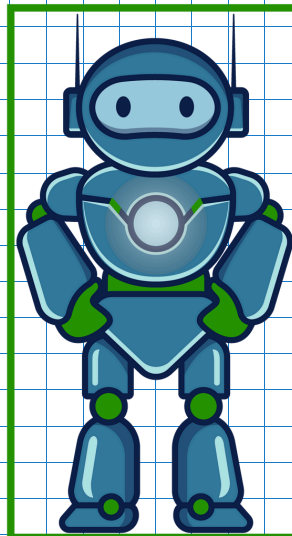


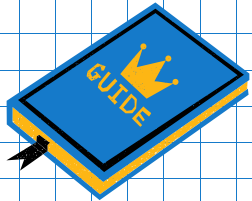
THINK OF:

- 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.





RÈGLES GÉNÉRALES

aide-mémoire



MISE EN PLACE

Placez votre robot à la position de départ. Appuyez sur le bouton pour démarrer le programme et laissez votre robot faire le travail!

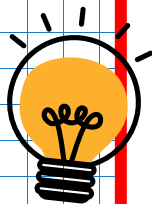
Lorsque votre programme débute, vous ne pouvez plus toucher votre robot.

2

min

MINUTERIE

Vous aurez **2 minutes** pour chaque essai. Vous aurez assez de temps pour faire deux essais ou plus, dépendant de l'achalandage de la file d'attente.



TRUCS CHOUETTES

Presque tout a déjà été fait par un étranger gentil qui partage ses connaissances sur Internet. En utilisant les bons mots-clés, vous devriez trouver ce dont vous avez besoin!

COMMENT GAGNER

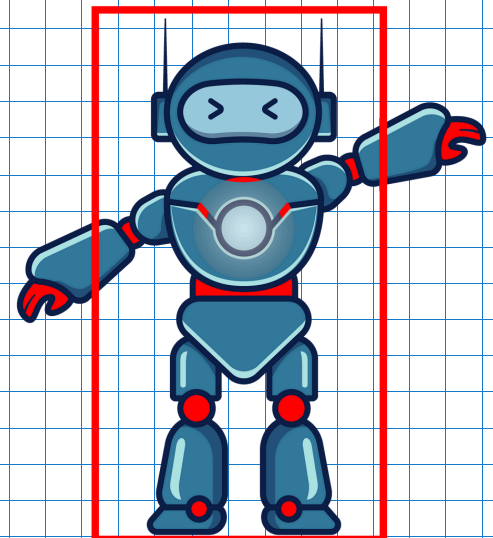
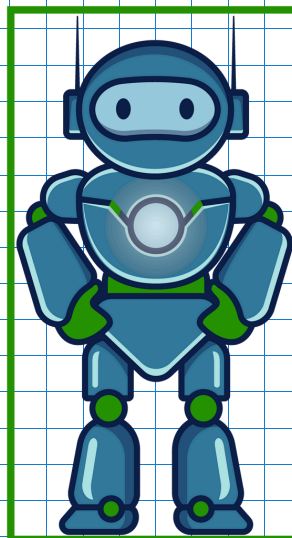
Trouvez la **condition gagnante** de chaque défi. En cas d'égalité, une seconde condition pourrait déterminer le meilleur robot.

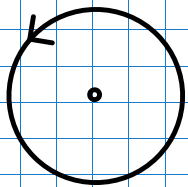
PENSEZ À:

- La simplicité pour gagner
- Quel(s) capteur(s) utiliser
- Où placer le(s) capteur(s)
- Améliorer la performance
- Documenter vos progrès

DIMENSIONS

Chaque pièce de votre robot, **incluant les pièces mobiles**, doit être contenue dans un prisme de 250 mm x 250 mm x 320 mm de haut.





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.



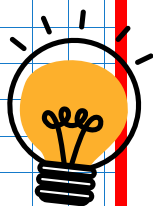
MY ROBOT CAN:

- 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!

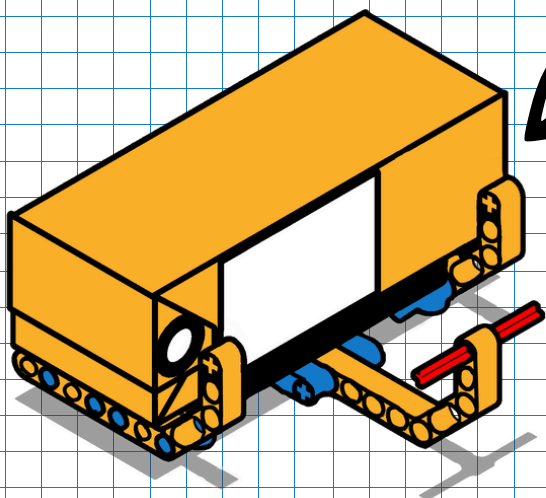


SPECIAL RULE

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

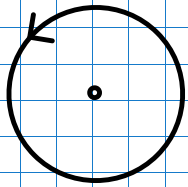
THE SLED

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



DISTANCE (MM) DISTANCE (MM) DISTANCE (MM)





TRACTEUR ACTEUR

aide-mémoire

DÉFI

Un traîneau porte une boîte de jus de 200 ml **remplie**. Votre robot doit **tirer le traîneau** par-dessus la colline et toucher au mur arrière.

Votre robot doit **afficher la distance** séparant le traîneau et le mur, y compris la colline.

La mesure la plus précise affichée gagne. En cas d'égalité, le robot le plus léger gagne.



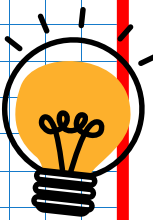
MON ROBOT PEUT:

- Tirer le traîneau
- Mesurer les distances franchies
- Surmonter la petite colline
- Calculer la distance **en mm**
- Afficher la distance **en mm**

TRUCS CHOUETTES

N'oubliez pas d'**ajouter la longueur de votre robot**.

Chaque rotation de roue équivaut à une distance parcourue... Tant que vos roues ne glissent pas !

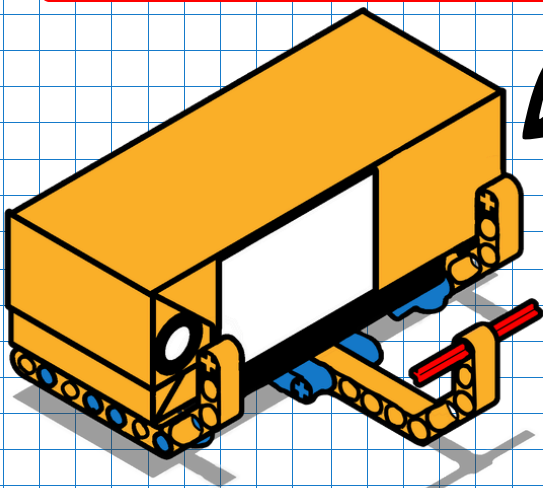


RÈGLE SPÉCIALE

Votre capteur de distance peut uniquement faire face aux murs latéraux. Vous pouvez l'utiliser pour aider votre robot à se positionner correctement.

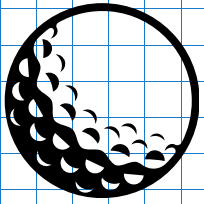
LE TRAÎNEAU

Demandez à un adulte les plans pour construire le vôtre. **Ne buvez pas le jus**, vous avez besoin du poids d'une **boîte de jus remplie** !



DISTANCE (MM) DISTANCE (MM) DISTANCE (MM)





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.

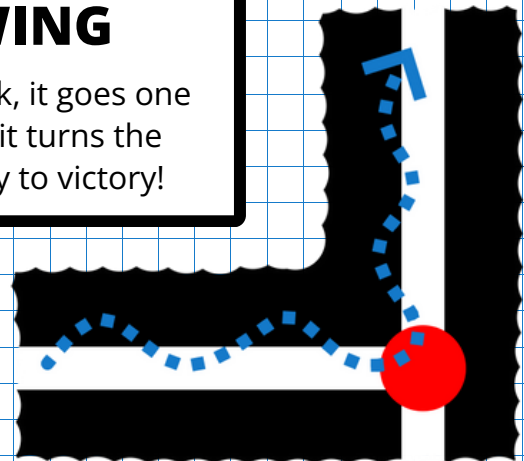
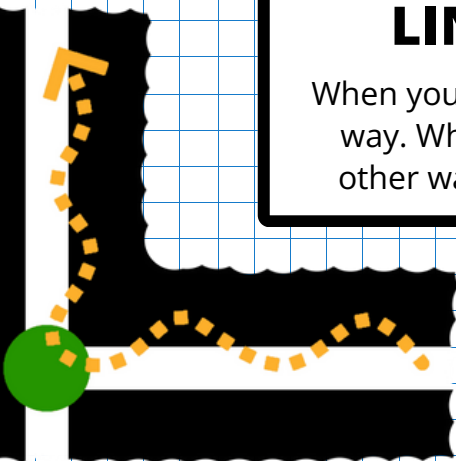
The way in which you bring the golf balls to the rescue tile doesn't matter.

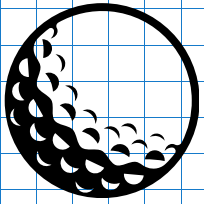
SPECIAL RULE

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!





RECHERCHE & SAUVETAGE

aide-mémoire

DÉFI

Votre robot doit **suivre la ligne** et naviguer à travers les **intersections** des **16 tuiles**.

Il peut y avoir jusqu'à **4 balles de golf** sur le terrain. Amenez-les à la **tuile de sauvetage** pour des points supplémentaires.

Le plus de points marqués gagne!
Le temps restant vaut des points supplémentaires.



MON ROBOT PEUT:

- Suivre la ligne blanche
- Tourner à gauche (point rouge)
- Tourner à droite (point vert)
- Récupérer jusqu'à 4 balles
- Finir rapidement

TRUCS CHOUETTES

Votre **capteur de couleurs** devrait voir une de ces quatre couleurs: rouge, vert, noir ou blanc. Pour chaque couleur, votre robot tourne dans une certaine direction pour suivre le chemin.

La manière dont vous amenez les balles de golf à la tuile de sauvetage n'a pas d'importance.

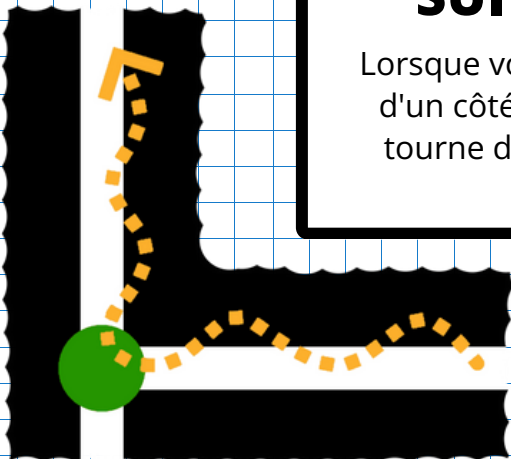


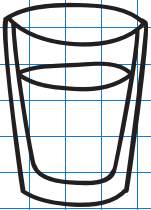
RÈGLE SPÉCIALE

Placez vous-mêmes jusqu'à 4 balles de golf sur le terrain avant de faire votre essai.

SUIVRE UNE LIGNE

Lorsque votre robot détecte du noir, il va d'un côté. Lorsqu'il détecte du blanc, il tourne de l'autre côté. Dandinez-vous vers la victoire !





CUP CONQUEROR

cheat sheet

CHALLENGE

Your robot should push the **15 cups** out of the **circular arena**.

The robot removing the most cups in the shortest attempt time wins. In the event of a tie, the lightest robot wins.

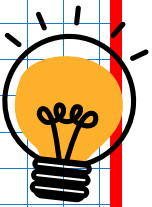


MY ROBOT CAN:

- Push party cups
- Detect the white perimeter
- Keep itself inside the arena
- Get to all the cups
- Optional : Detect the cups

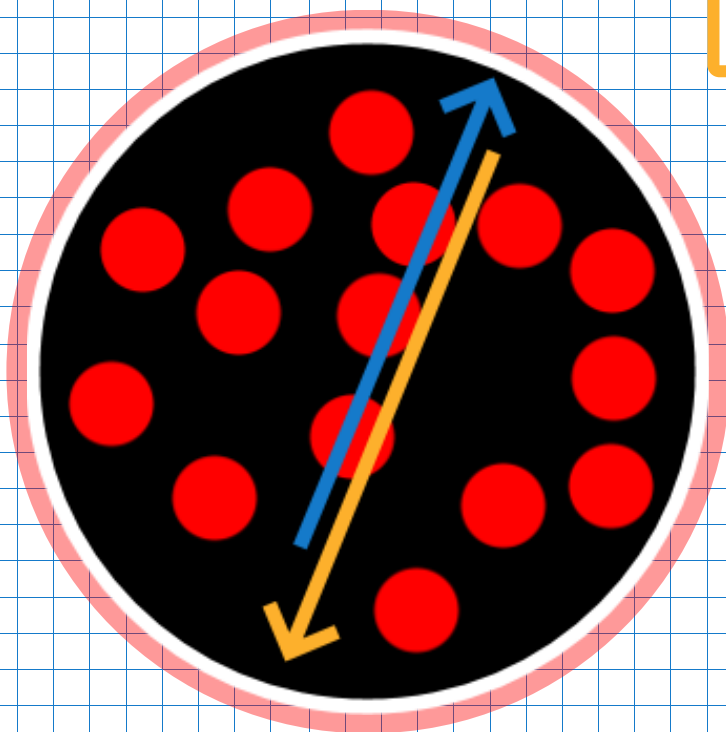
HOT TIPS

Try putting your color sensor in a spot that detects the white perimeter without your robot's wheels leaving the arena.



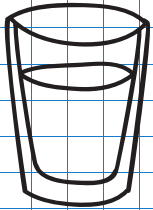
SPECIAL RULE

You can put the cups and your robot where you want on the arena to start the attempt.



THE ARENA

Make sure your robot doesn't only do back and forths... You want to cover the whole arena arena!



CONQUÉRANT DES VERRÈS

aide-mémoire

DÉFI

Votre robot doit sortir les **15 verres** de l'**arène circulaire**.

Le robot retirant le plus grand nombre de **verres** avec un temps le plus court gagne. En cas d'égalité, le robot ayant tombé le moins de fois gagne. si l'égalité persiste, le robot le plus léger gagne.



TRUCS CHOUETTES

Tentez de positionner votre capteur de couleur à un endroit qui permet à votre robot de détecter la **ligne blanche** sans sortir de l'**arène**.

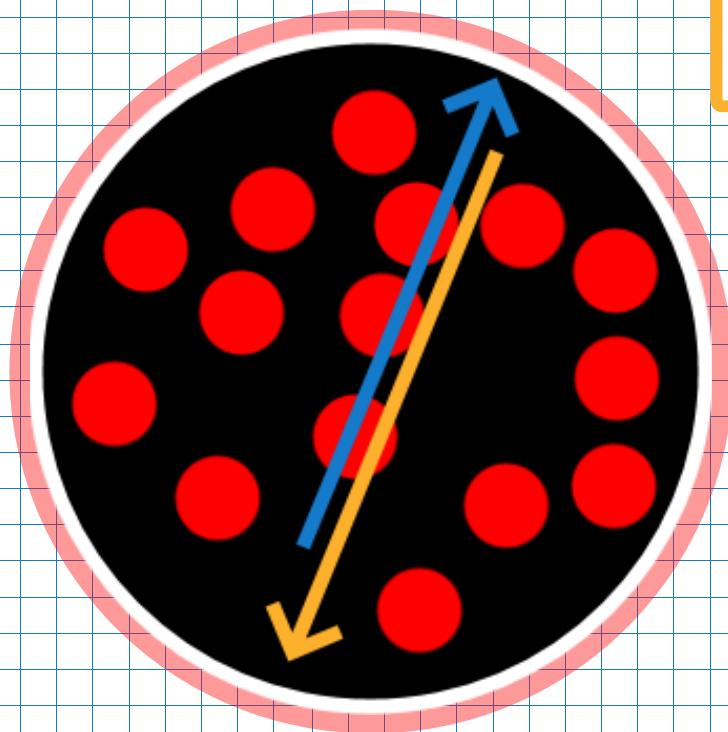


MON ROBOT PEUT:

- Sortir les verres de l'arène
- Détecter la ligne blanche
- Rester sur l'arène
- Atteindre tous les verres
- Optionnel : détecter les verres

RÈGLE SPÉCIALE

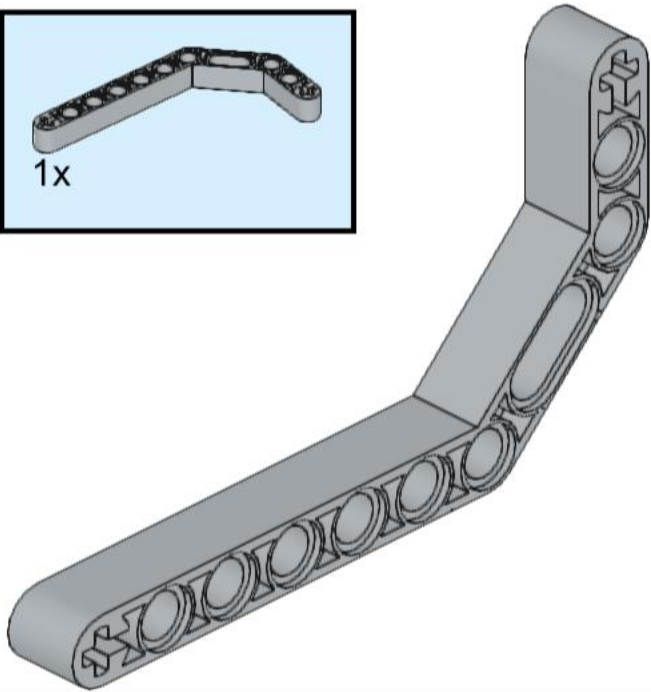
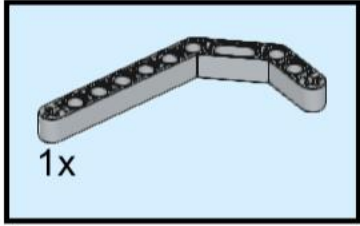
Vous pouvez placer les verres et votre robot où vous voulez sur l'arène au début de l'essai.



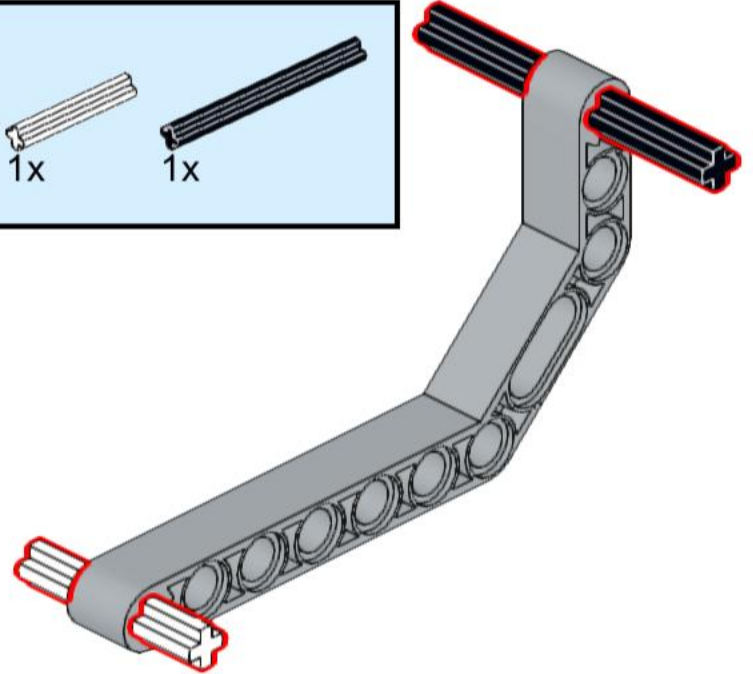
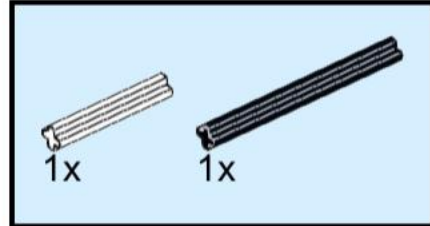
L'ARÈNE

Assurez-vous que votre robot ne fasse pas uniquement des allers-retours... Vous voulez couvrir l'entièreté de l'arène!

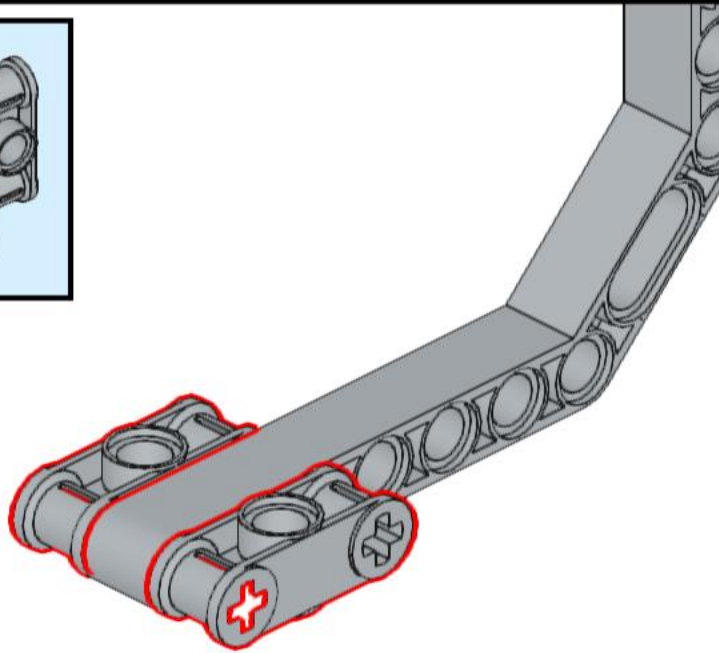
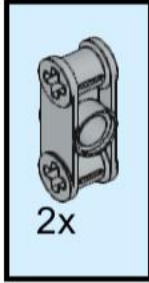
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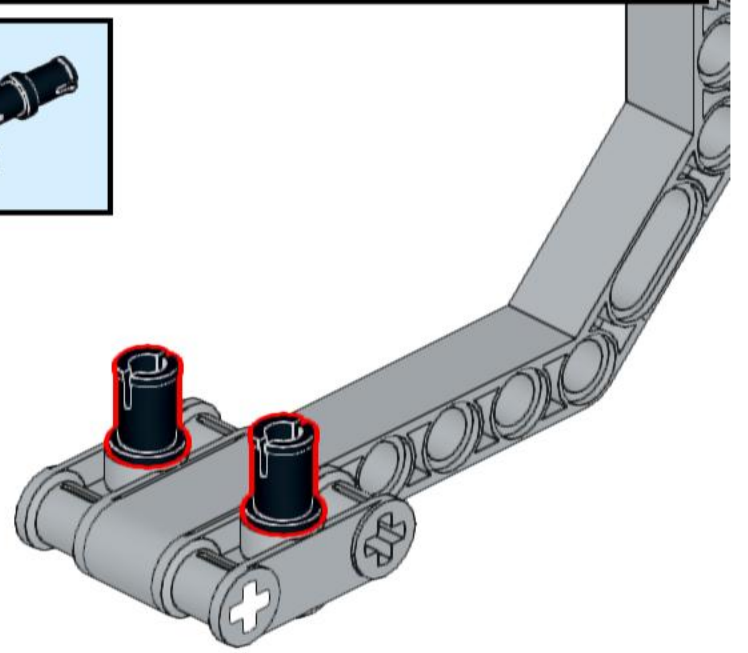
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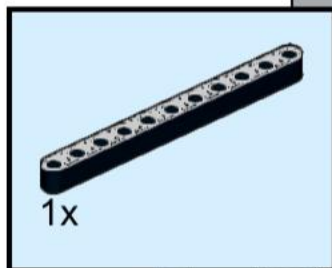
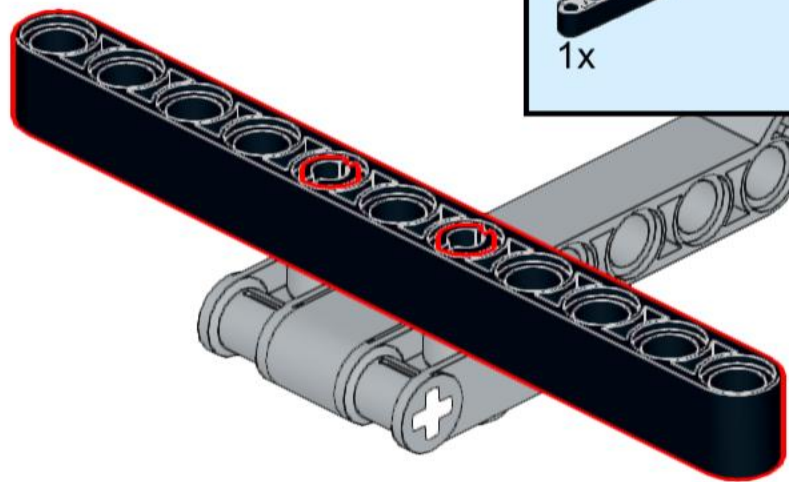
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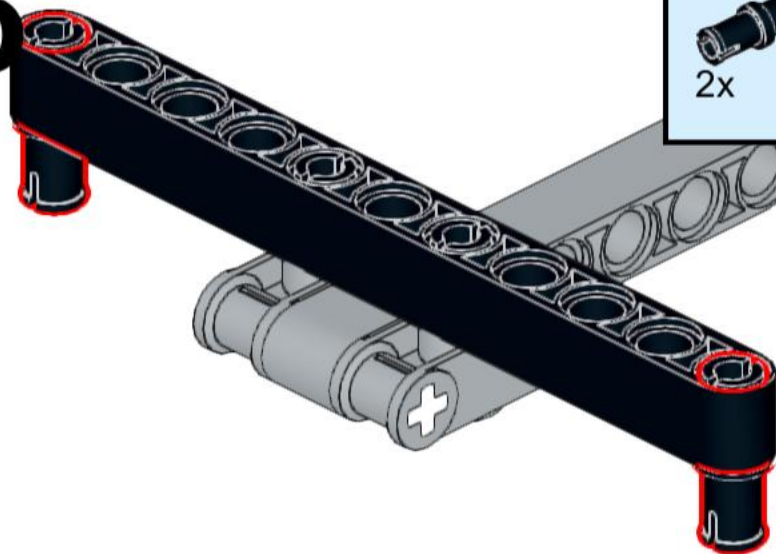
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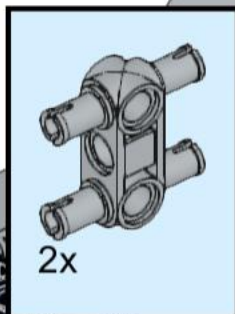
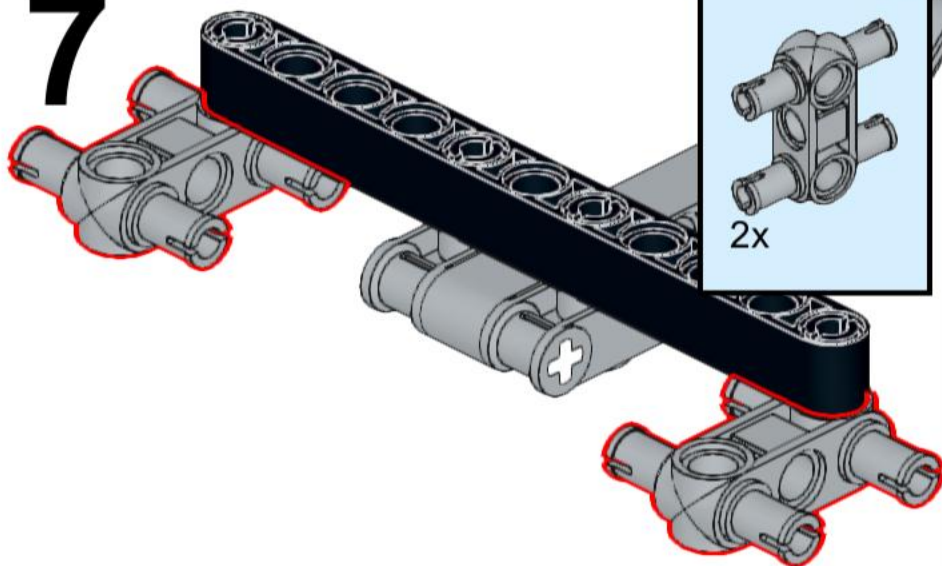
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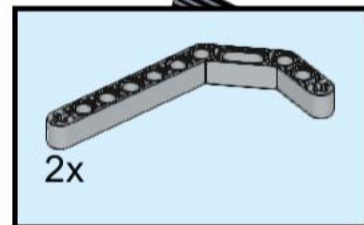
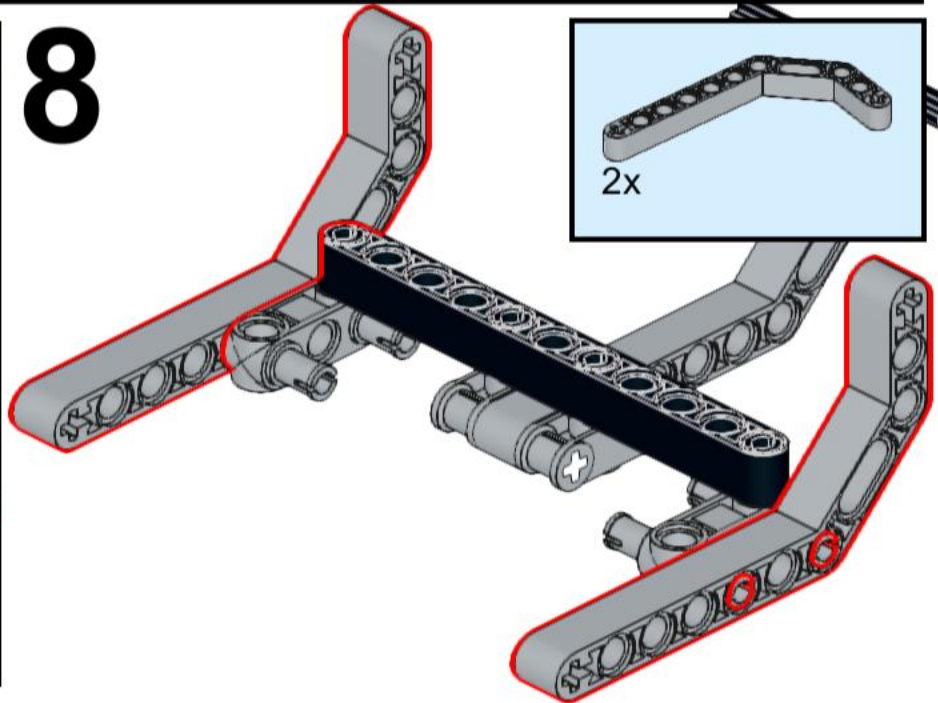
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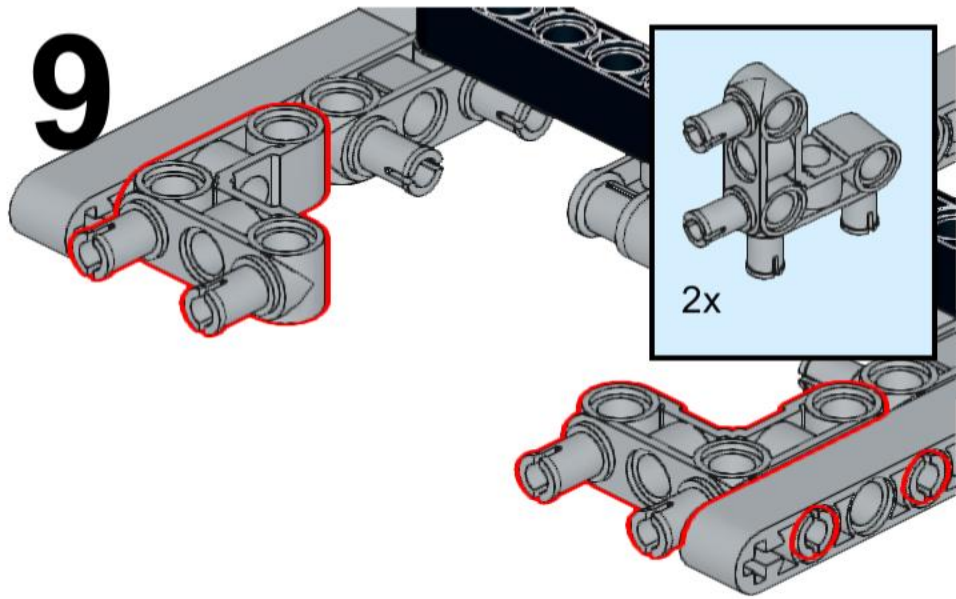
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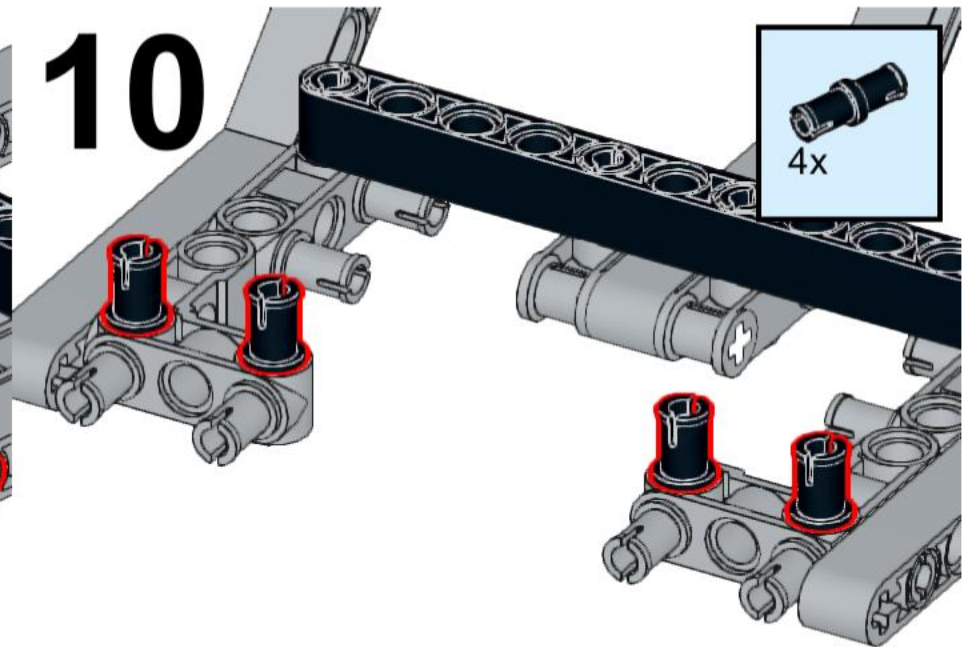
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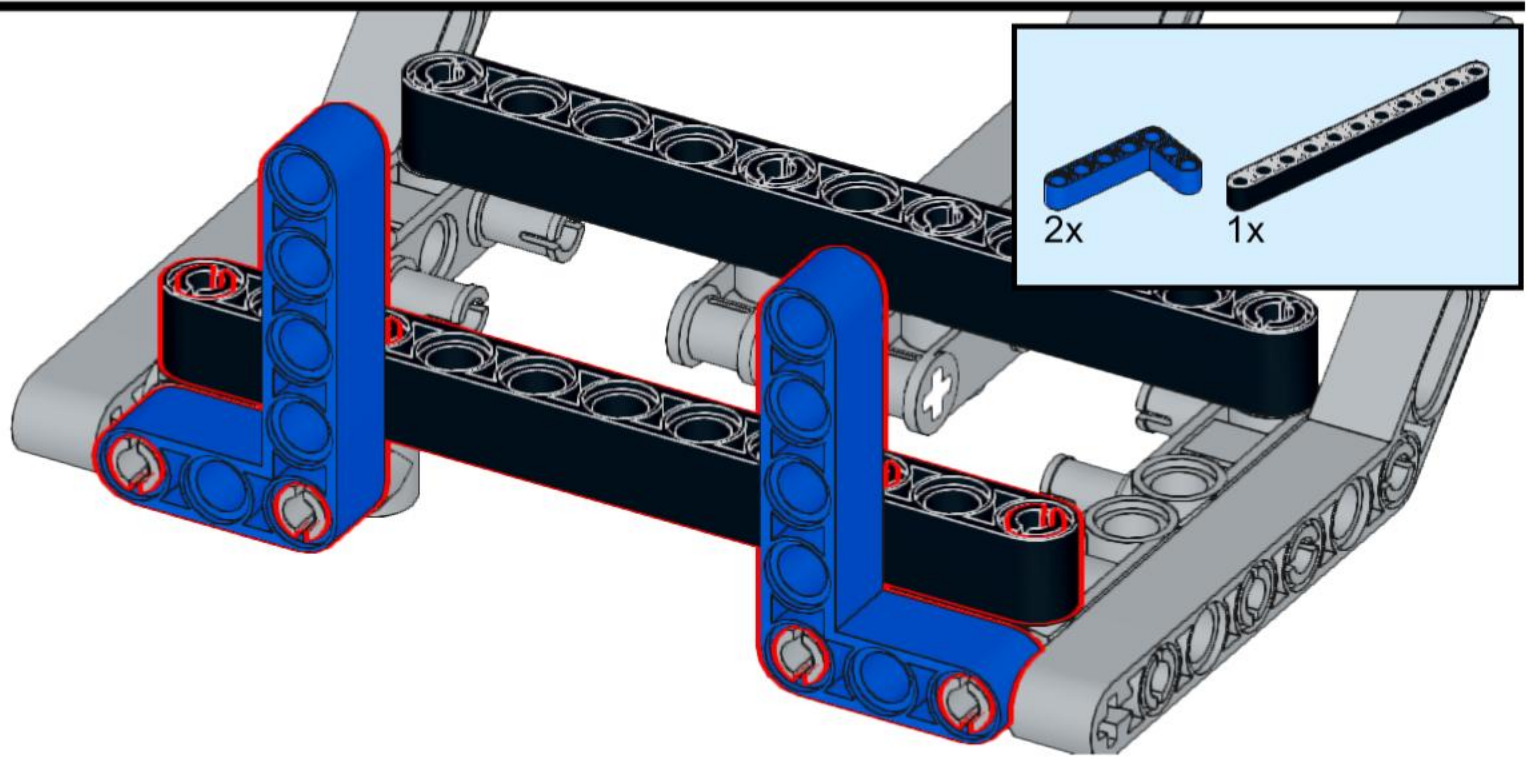
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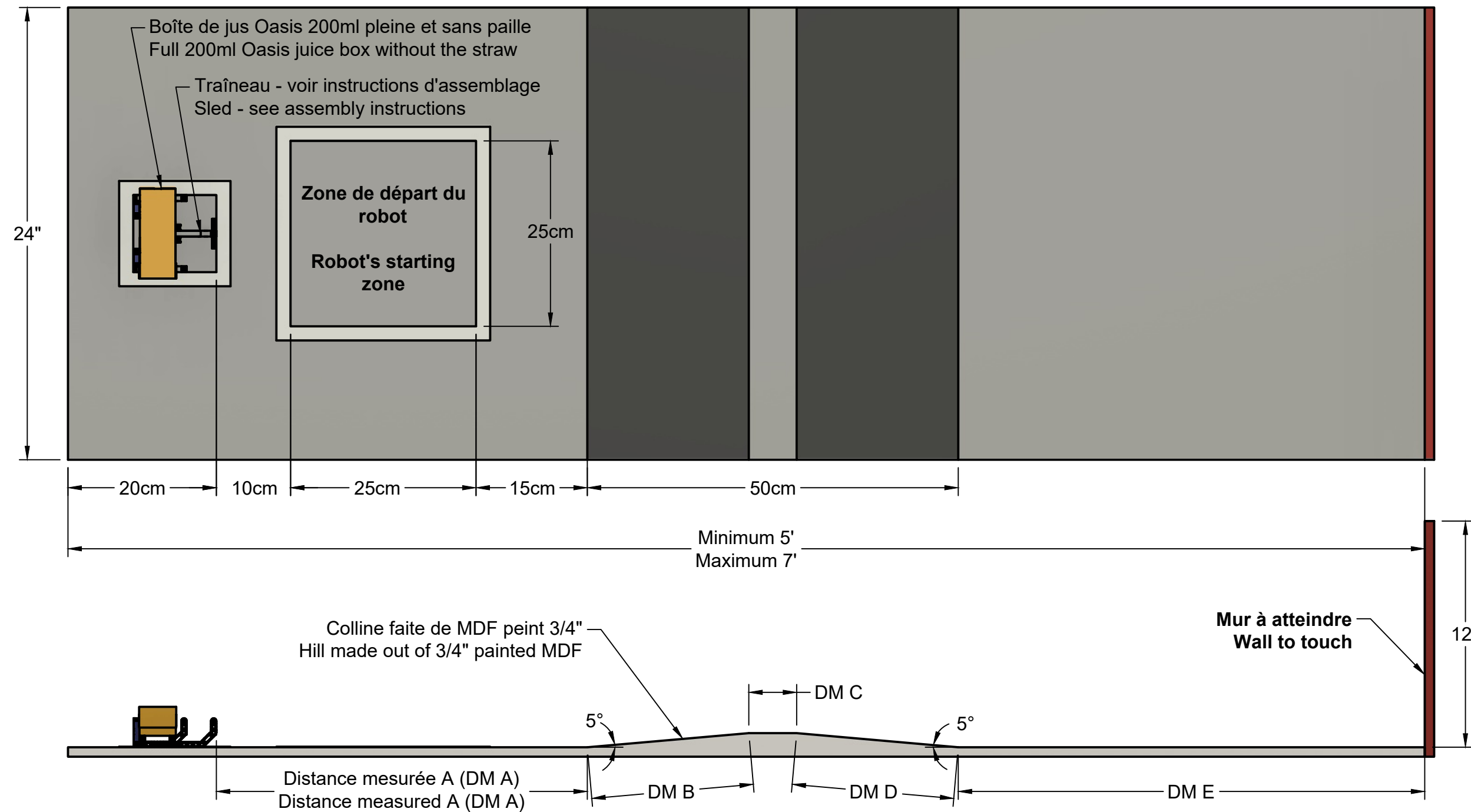


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11

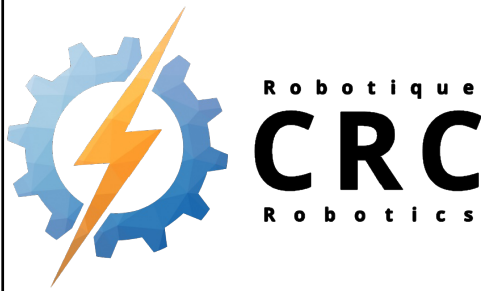


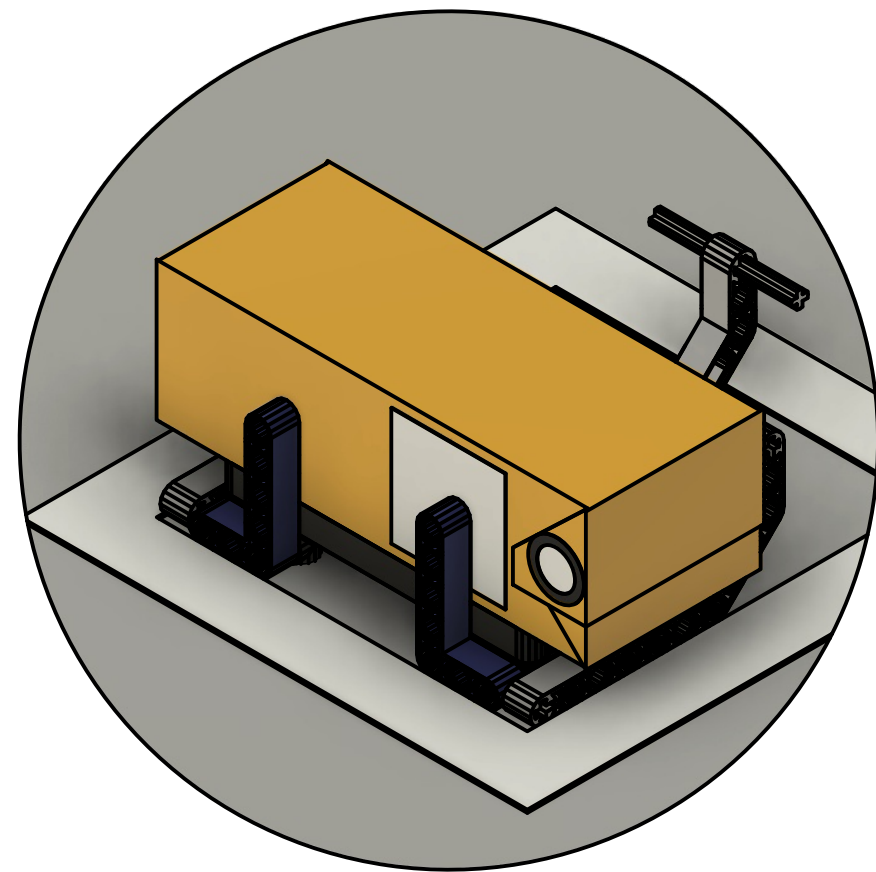


NOTES:

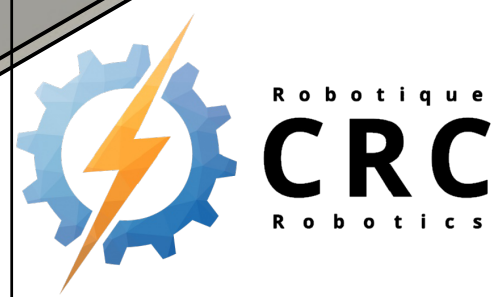
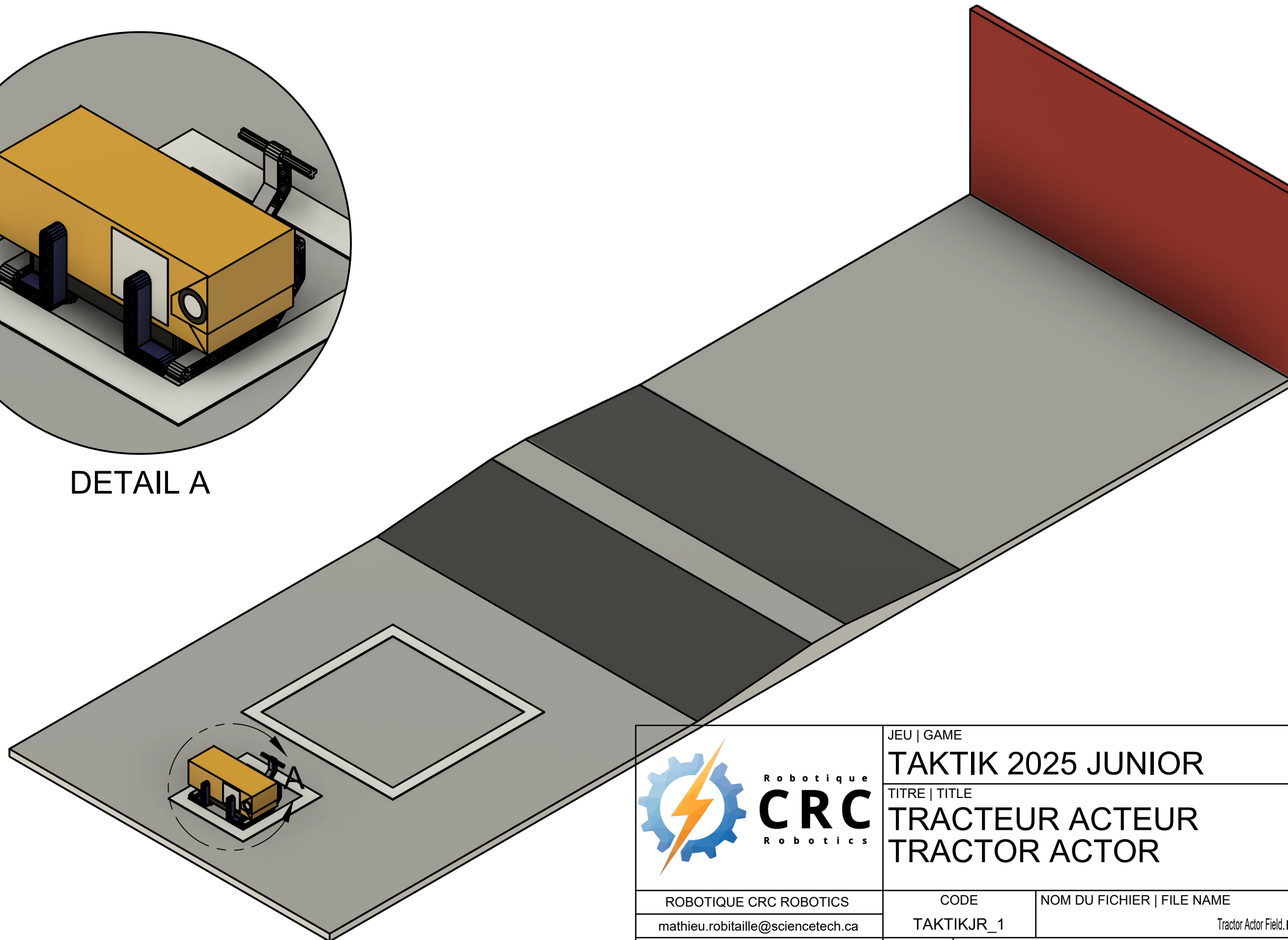
La distance à mesurer est la distance entre le devant du traîneau et le mur.
 Distance à mesurer = (DM A) + (DM B) + (DM C) + (DM D) + (DM E).
 Le terrain est entouré d'un mur externe de 12" de hauteur fait de contreplaqué 1/2" peint en rouge.
 Les zones de départ pour le robot (25cm x 25cm) et du traîneau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

	JEU GAME		TAKTIK 2025 JUNIOR	
	TITRE TITLE		TRACTEUR ACTEUR TRACTOR ACTOR	
ROBOTIQUE CRC ROBOTICS	CODE	NOM DU FICHIER FILE NAME		PAGE
mathieu.robaille@sciencetech.ca	TAKTIKJR_1	Tractor Actor Field.PDF		1/2
SIGNATURE Mathieu Robaille 2024-09-15	1:6	Vous éprouvez des difficultés? Demandez de l'aide! Having a hard time? Ask for help!		



DETAIL A



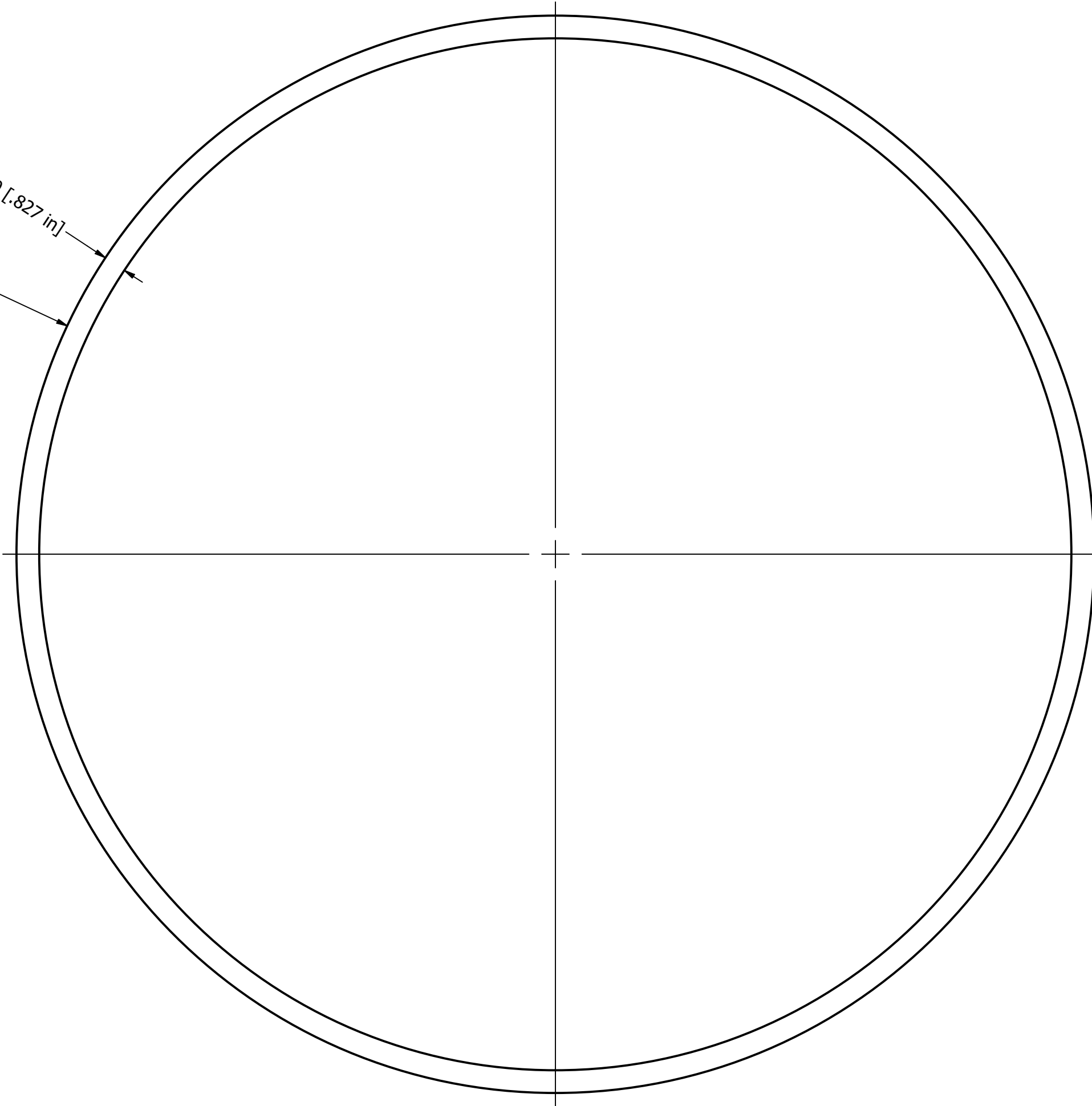
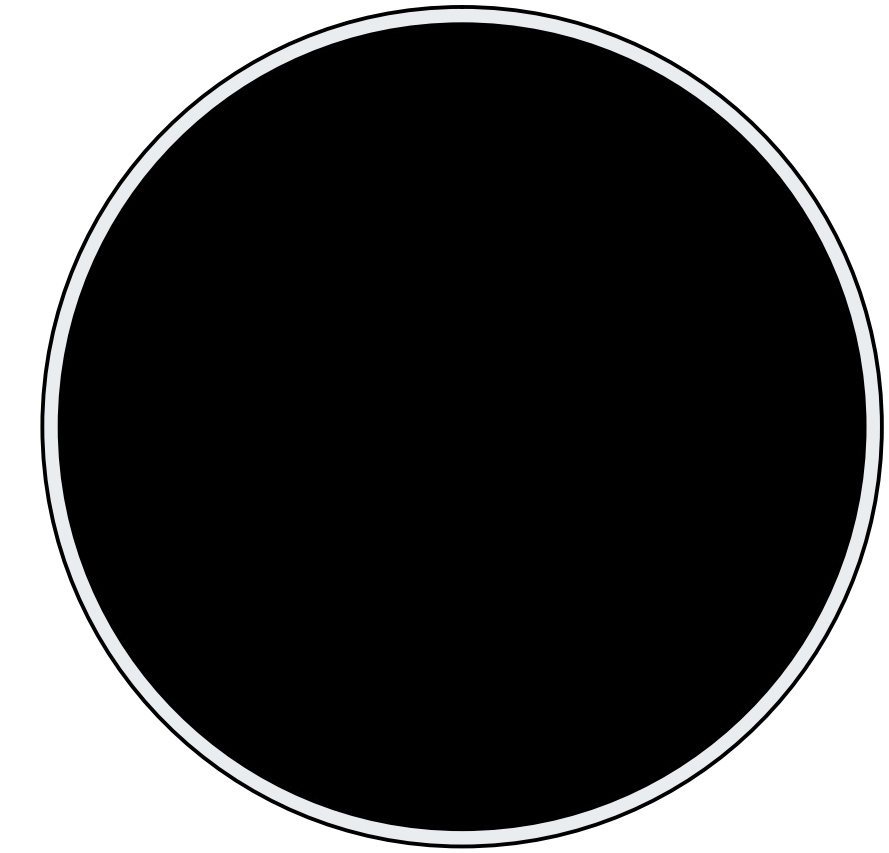
ROBOTIQUE CRC ROBOTICS		JEU GAME	
mathieu.robaille@sciencetech.ca		TAKTIK 2025 JUNIOR	
SIGNATURE Mathieu Robaille 2024-09-15		TITRE TITLE	
1:5		TRACTEUR ACTEUR TRACTOR ACTOR	
		CODE	NOM DU FICHIER FILE NAME
		TAKTIKJR_1	Tractor Actor Field.PDF
		PAGE	
		2/2	
		Vous éprouvez des difficultés? Demandez de l'aide! Having a hard time? Ask for help!	

NOTE:

∅ mm [∅ in]

∅1000.00 [∅39.370 in]

21.00 [.827 in]



DRAWN	Nicolas Savard	1/9/2025
CHECKED		
QA		
MFG		
APPROVED		

CRC Robotics			
TITLE			
SIZE		DWG NO	REV
C		Junior Mystery Challenge	
SCALE	1 / 4	SHEET 1 OF 1	