



2027 World GreenMech Contest GMJR-P Teacher Training



Competition Categories

GreenMech (GM), Robot for Mission (R4M),
and GreenMech Jr. (GMJR)





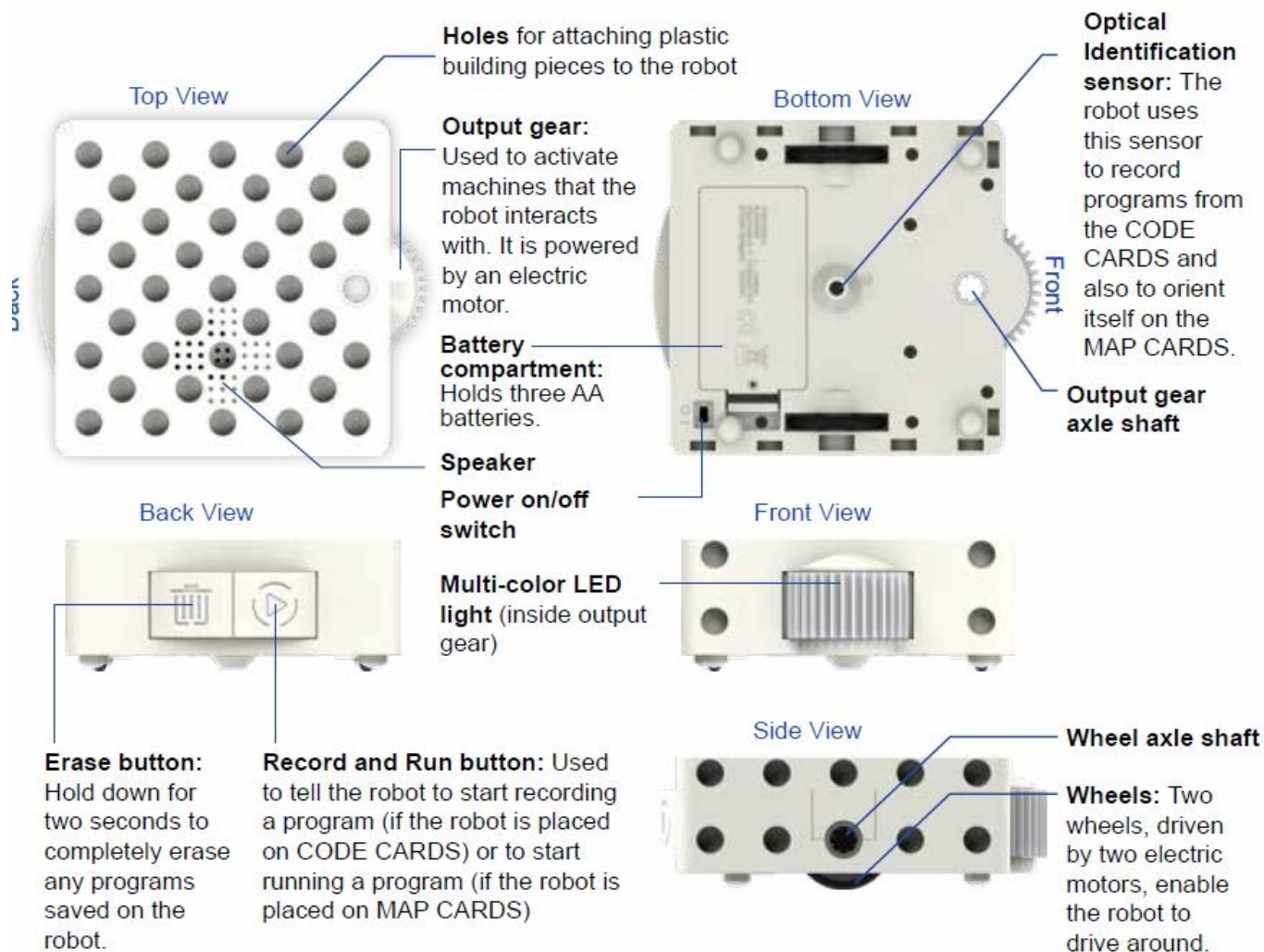
GreenMech Jr. (GMJR)



GreenMech Jr. consists of two competitions:

1. **Science**
Kindergarten Senior Class to Grade 4
2. **Programmer**
Kindergarten Senior Class to Grade 4

Getting to Know the Controller



Instruction Cards



Every program always starts with a **Start** code card.



There are also cards that make the robot **move**.



There are cards that tell the robot to make **sounds**.



There are **number** cards which **repeat** the card immediately before it a number of times.



Every program always ends with an **End** code card.



There are cards that make the robot's **output gear turn**.



There are cards that tell the robot to **light up** in a certain way or with a specific color.



There are **simple loop cards**, **function cards**, **conditional cards**, and **event cards**. You will learn about all of these later in the manual.

I Can Program, Too!

Instruction Cards – Start and End



Start

Every main program must begin with this Start card.
This Start card is used only in the main program.



End

Every program must end with this End card.
This End card can be used in the main program
and functions.

Basic Instruction Cards



Forward

This instruction card moves the robot forward one map card.
Only in the main program: If a Number Card follows it, the action is repeated that many times.



Backward

This instruction card moves the robot backward one map card.
Only in the main program: If a Number Card follows it, the action is repeated that many times.



Turn Right (Clockwise)

This instruction card turns the robot right 90 degrees.
Only in the main program: If a Number Card follows it, the action is repeated that many times.



Turn Left (Counterclockwise)

This instruction card turns the robot left 90 degrees.
Only in the main program: If a Number Card follows it, the action is repeated that many times.



Pause

This instruction card pauses the robot for a set number of seconds.
Used only in the main program: If a Number Card follows it, the number card sets the seconds to pause.

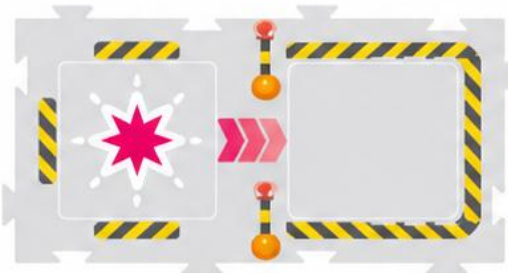
Map Cards



The robot always reads and executes Map Cards beginning with the Start Map Card.



Some Map Cards trigger special-function Events.

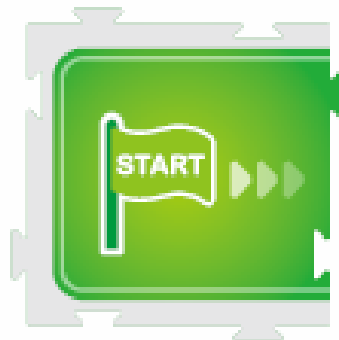


Some Map Cards are larger than standard cards.

Start Map Card

Start Map Cards

Front



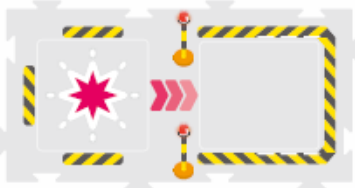
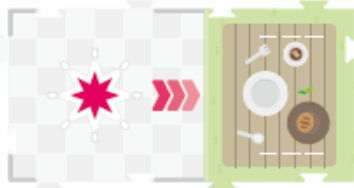
Back



Event Map Card

Event Map Cards*	
Front	Back
 Event 2	 Event 4
 Event 3	 Event 1

Base Card

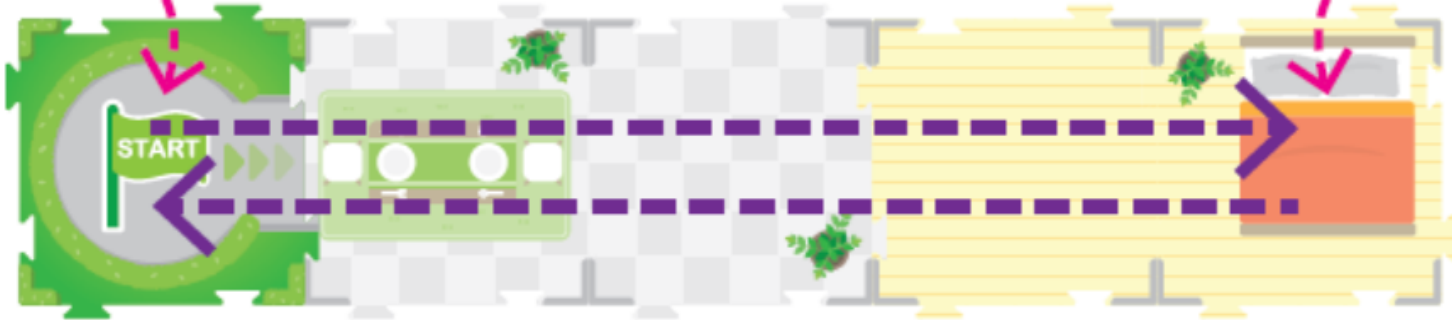
Base Map Cards	
Front	Back
 Red Function Base Map Card Front	 Red Function Base Map Card Back
 Green Function Base Map Card Front	 Green Function Base Map Card Back
 Blue Function Base Map Card Front	 Blue Function Base Map Card Back

Try It - Start, End, and Move Forward

Challenge 1: Wake Up Sleepy Frankie!

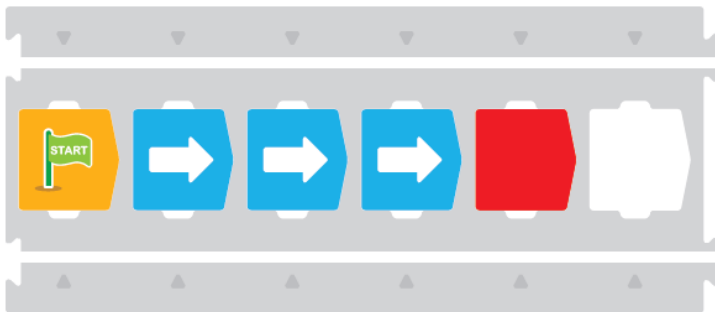
Map

Start, End, and Move Forward

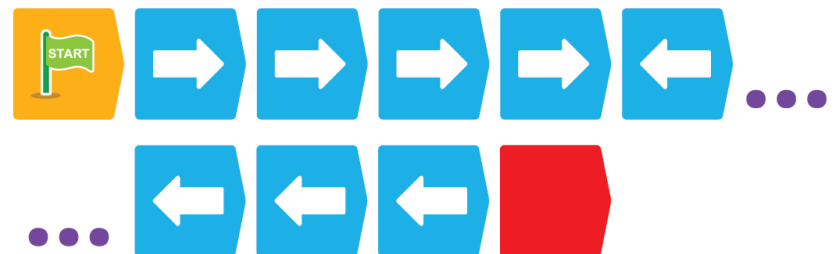
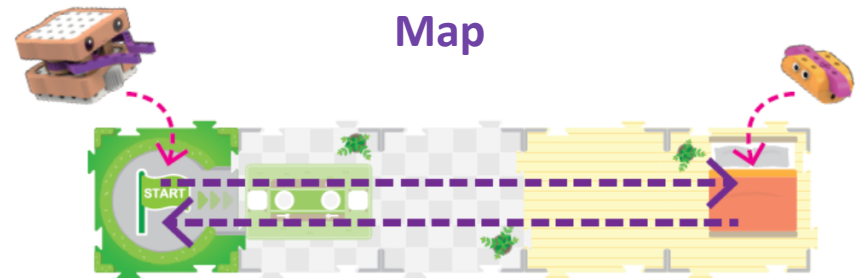


Record Your Program

Follow the Teacher



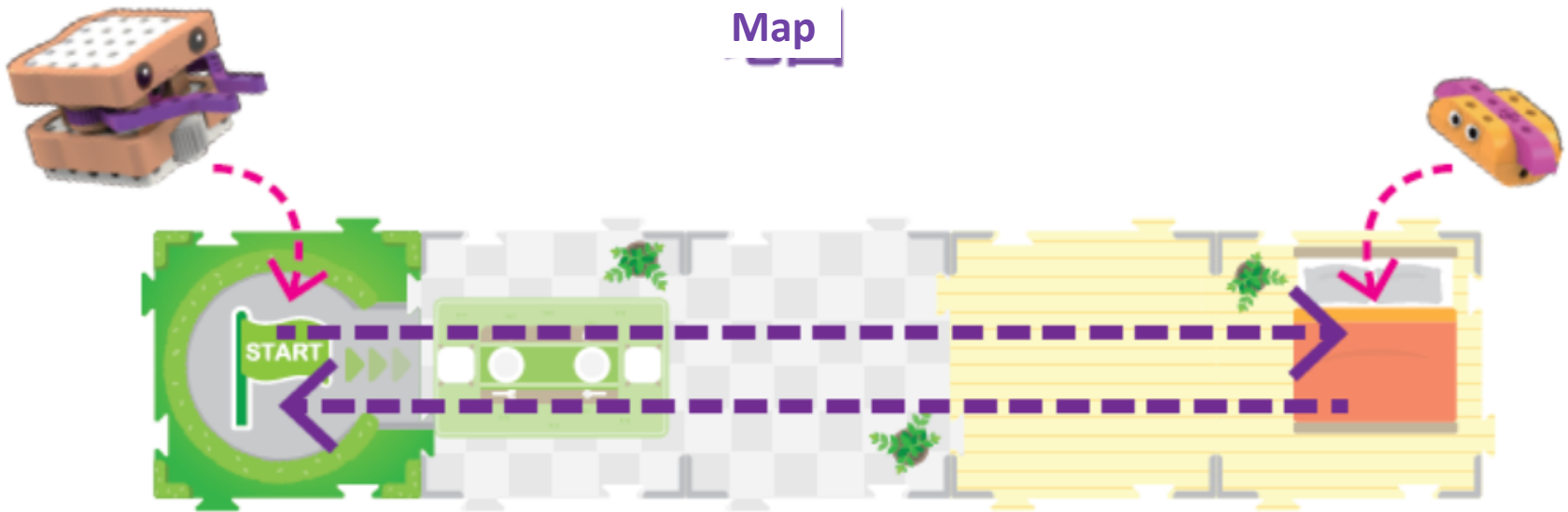
Challenge 1



How Can You Shorten Your Program?

Using Number Cards

Map

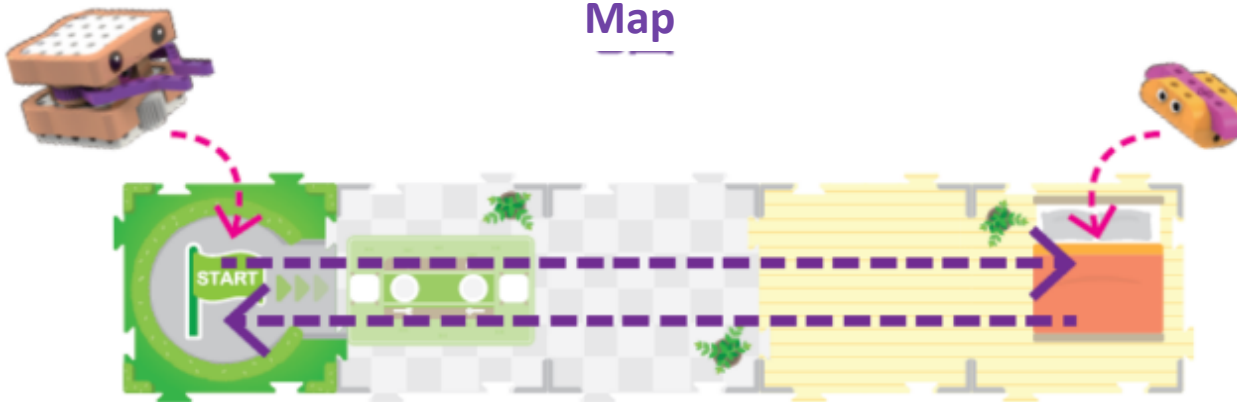


Team Challenge! (Using Number Cards)

Challenge 1

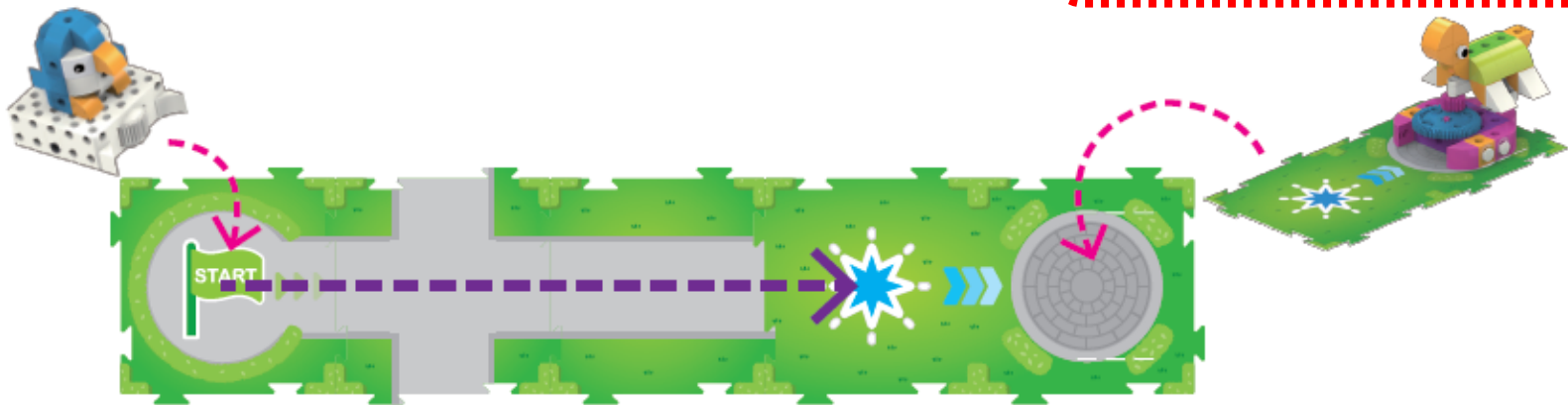


Map



Using Base Map Cards

Base Map Cards,
Character Interaction,
and Scripts

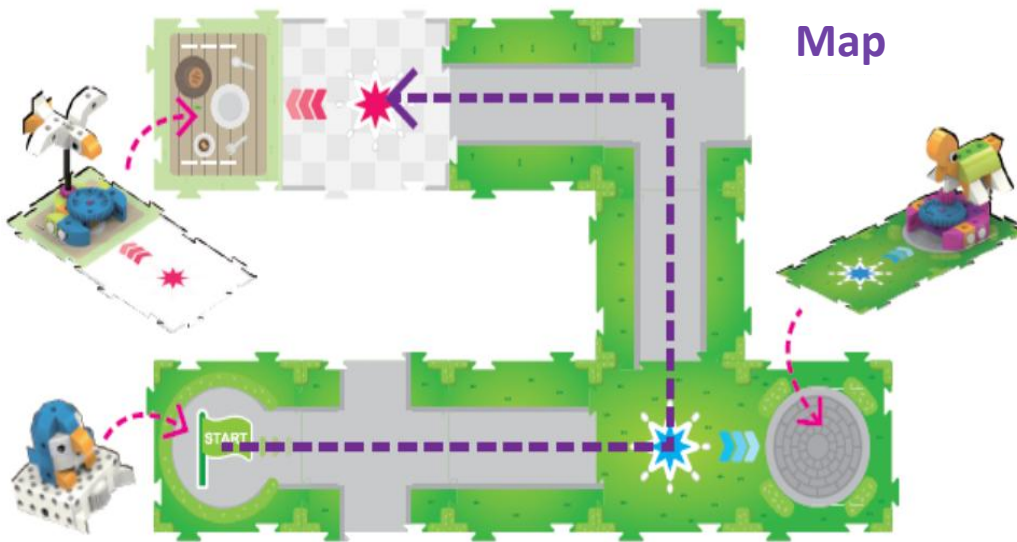


Q: Start at the Start Card and move to the **blue-star** Map Card.
Then make one full left turn and one full right turn.



Using Functions

Q: Start at the Start Card, pass the blue star, and reach the red-star Map Card. Play the sound of a fire engine at the blue star. At the red star, turn the output gear and turn on the red light.



Think About It!

1. Find the best route.
2. Blue function: Play the sound of a fire engine.
3. Red function: Turn the output gear, then turn on the red light.

Using Functions

Think About It!

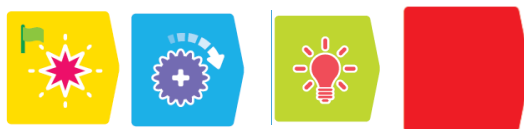
1. Find the best route.



2. Blue function: Play the sound of a fire engine.



3. Red function: Turn the output gear, then turn on the red light.





GMJR-P: Forest Guardians

This competition consists of five Missions:

[Mission 1: Habitat Restoration Master]

[Mission 2: Promote Ecotourism]

[Mission 3: Track Down Illegal Poachers]

[Mission 4: Fight Forest Fires]

[Mission 5: Eliminate Invasive Species]

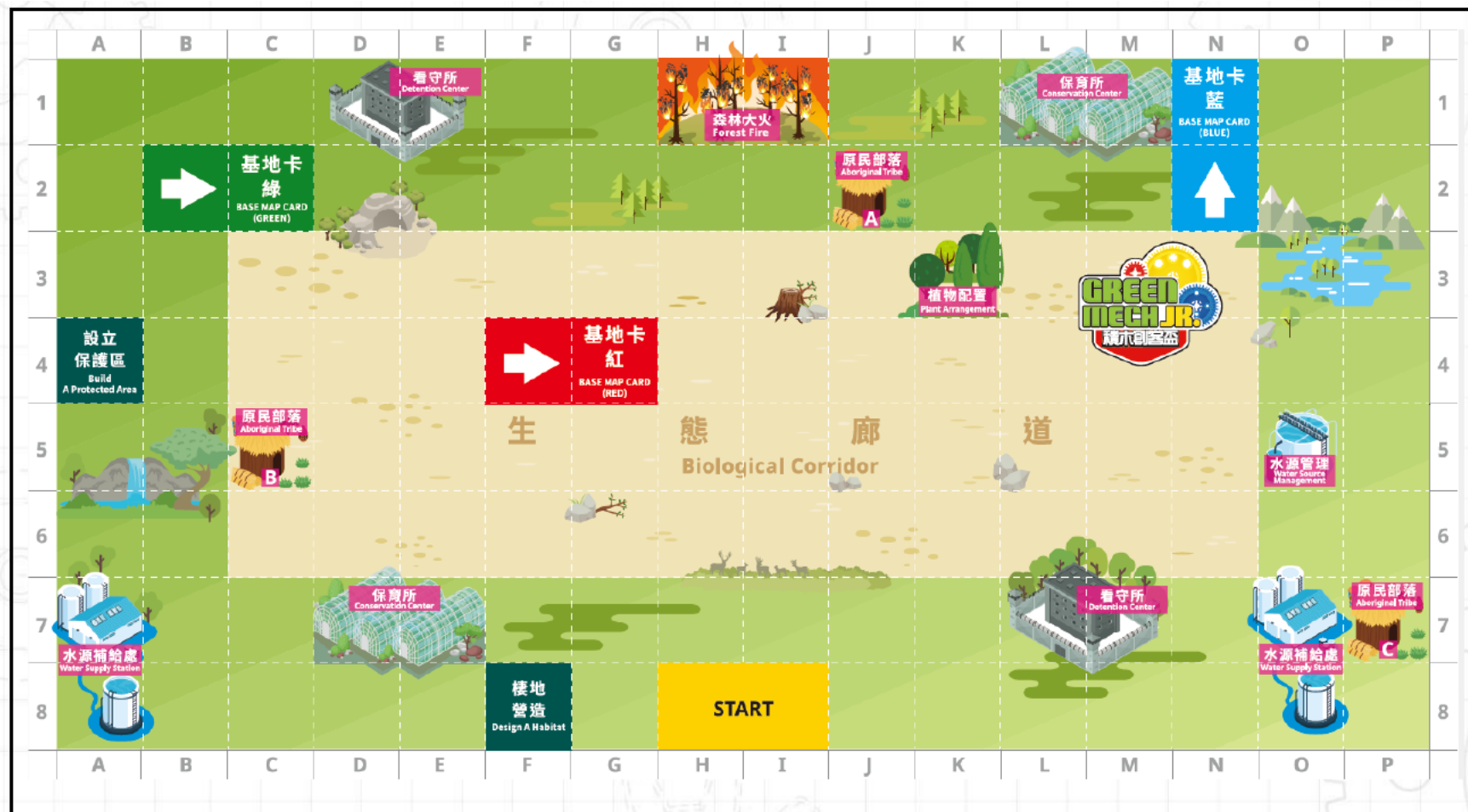
Competition Reference Video

Search YouTube for:

[2027 WGM] GMJr. Programmer - Intro



Competition Field



Competition Field: 240 × 120 cm

Competition Field

			Detention Center			Forest Fire			Conservation Center	Base Map -Blue ↑		
	→ Base Map - Green							Indig. Village A				
									Plant Arrangement			
Build a protected area					→ Base Map -Red							
		Indig. Village B			Eco.			Corridor				Water Source Management
Water Supply Station			Conservation Center							Detention Center		Indig. Village C
					Design A Habitat		Start				Water Supply Station	

Competition Field: 240 × 120 cm



Mission Background

As passionate Forest Guardians, the Gigo Team takes on the important responsibility of protecting our forests. Participants will explore the rich diversity of terrestrial ecosystems and embark on an adventure to protect nature and conserve wildlife while seeking a balance between sustainable ecosystems and human economic development.



Materials Requirements

Materials Requirements:

The Organizer will provide the Competition Field and the building blocks required for the Competition. All other Map Cards, Instruction Cards, robots, and building blocks must be **prepared by the team** and must be **completely unassembled**. Teams may not pre-assemble components or open and modify any part of the robot body. If a non-compliant condition cannot be corrected during Equipment Inspection, the team will be disqualified.



Robot Specifications

Robot Specifications:

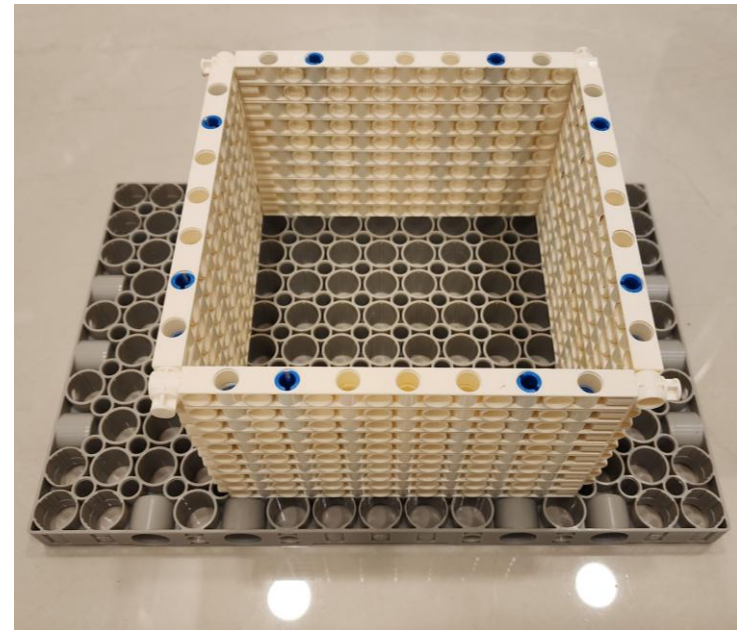
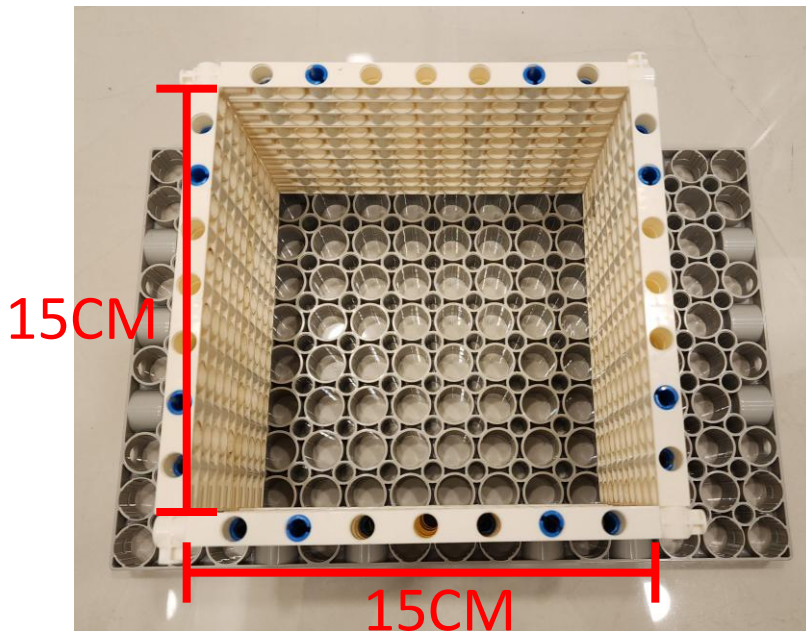
- (1) Each team may **prepare up to three robots**. Each robot must remain **within 15×15 cm throughout the Competition**. During Equipment Inspection, the robot memory must be cleared by pressing and holding the Delete button for 2 seconds. The controller body may not be modified; verified violations result in disqualification.
- (2) If participants need to retrieve a robot while a program is running, they must ask the Judge and wait for the Judge's signal. The timer does not stop.

Robot Specifications

Robot Specifications:

- (3) Only one robot may be on the Competition Field at a time. While one robot is operating, an off-field robot may be prepared for program loading.
- (4) After the robot program has finished running or has been reloaded, the robot must start from the Start Area. Before entering the competition field each time, the robot must first be placed inside the size-checking gauge. Only after the referee has confirmed that the robot complies with the size requirements may it be placed on the field to perform the mission.

Robot Specifications



※ Size-Checking Gauge Illustration: Before each time the robot enters the competition field, it must first be placed inside the size-checking gauge. The referee must confirm that the robot meets the size requirements before it may be placed on the field to perform the mission.



Robot Specifications

Robot Specifications:

- (5) Beginning in 2027, **electronic devices—including tablets, laptops, and smartwatches**—are prohibited. Using such a device during the Competition will result in **disqualification from both the Competition and awards.**



Competition Missions

Every Mission begins from the START Area. Teams may plan their own robot routes and freely choose which scoring items to attempt. Fifteen minutes before the Competition, each team will draw the locations of the invasive-species and native-species blocks for Mission 5. Participants will then have 15 minutes of preparation time, followed by 2 minutes to move items from the Preparation Area to outside the competition field. The Mission Challenge Time is 6 minutes. Once the timer starts, it cannot be stopped, and the full 6-minute period must elapse.



Competition Missions

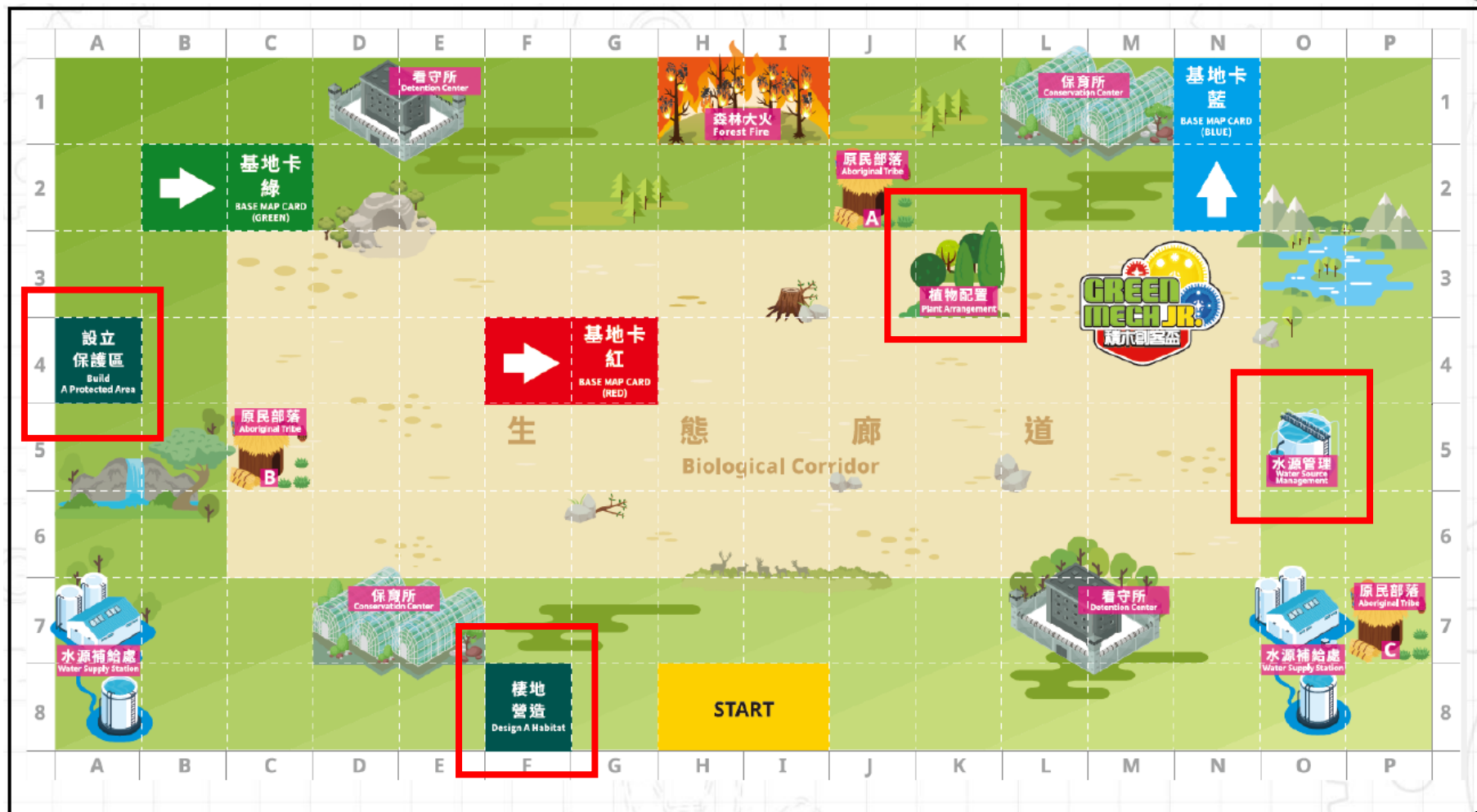
Individual Team Procedure	Time	Location	Notes
Team Draw	15 minutes before practice	Preparation Area	Draw the target-object placement locations for Mission 5
Team Practice	15 minutes	Preparation Area	Building-block assembly and programming are permitted.
Team Moves Items	2 minutes	From the Preparation Area to the Competition Field	The Map Cards, Instruction Cards, and robot may be moved from the Preparation Area to outside the Competition Field.
Team Competition	6 minutes	Competition Field	Assemble the Map Cards at the same time (they may not be pre-assembled), place a robot on the Competition Field to score, and continue programming as needed.



Mission 1: Habitat Restoration Master

1. Description: The map contains four Habitat Restoration Areas: Establish Protected Area, Plant Arrangement, Habitat Creation, and Water Resource Management. The robot scores by reaching each area and completing the designated action.
2. Scoring: At each area, the robot must complete one full rotation. Each action earns 5 points. Completing all four areas earns 5 additional points, for a maximum of 25 points.

Mission 1: Habitat Restoration Master

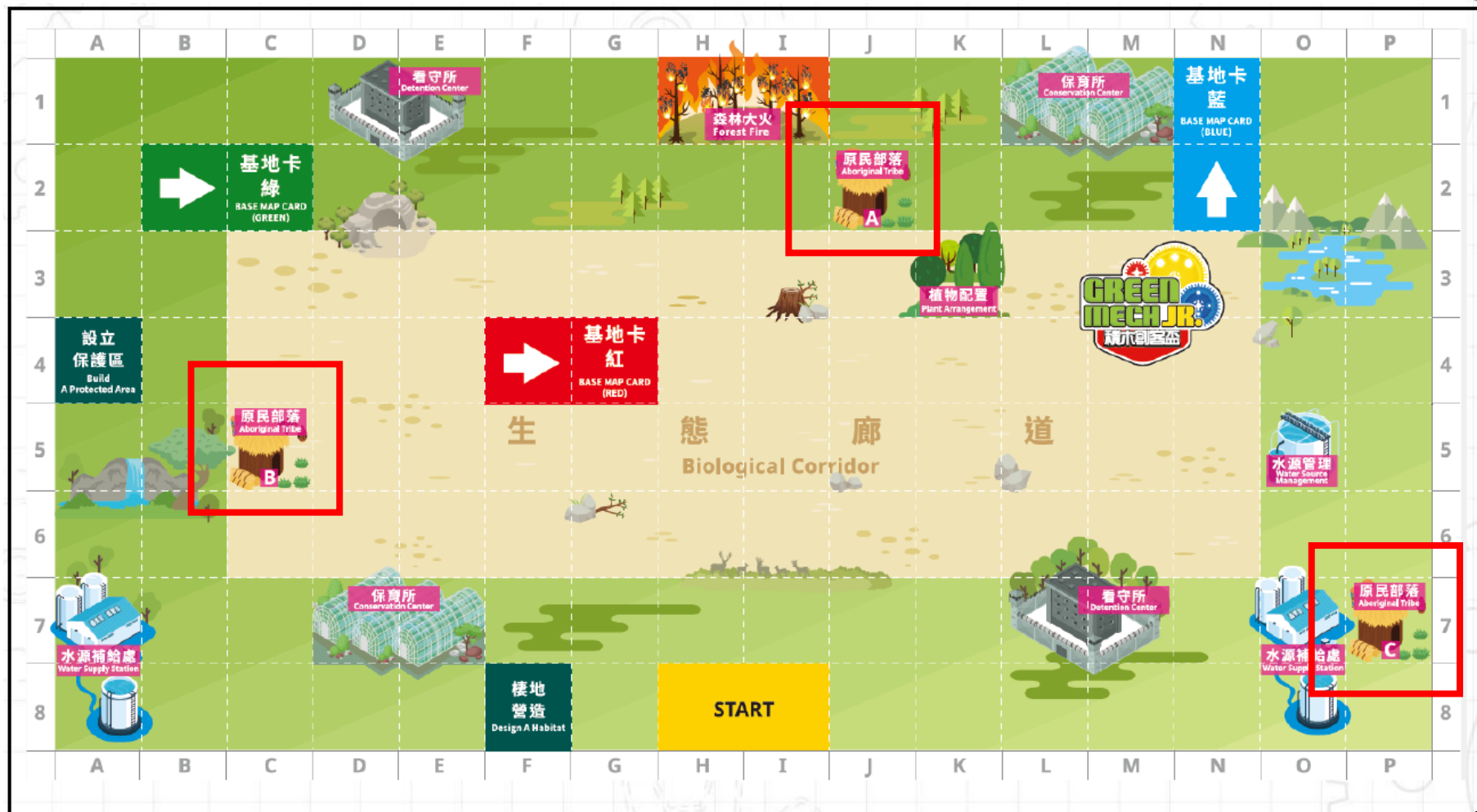




Mission 2: Promote Ecotourism

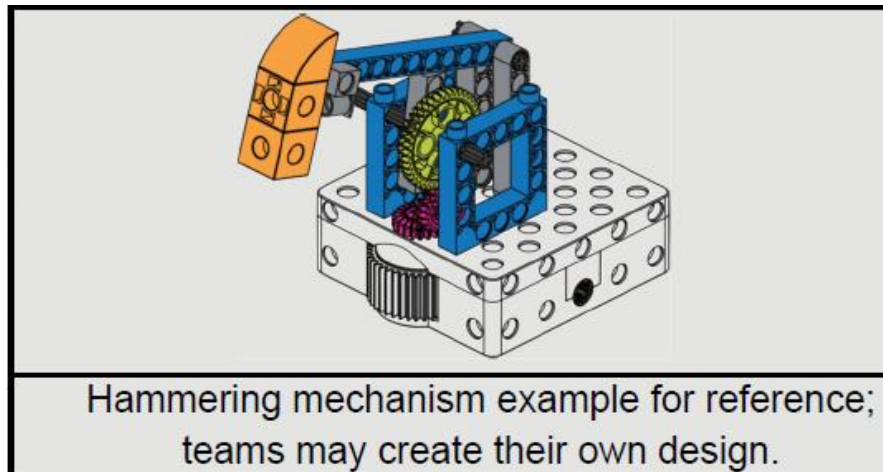
1. Description: Areas A, B, and C represent Indigenous communities. The robot scores by entering each area and completing its designated action.
2. **Scoring: In Areas A, B, and C, the robot emits red, yellow, and blue light respectively. One completed area earns 5 points; two earn 12 points; all three earn 20 points.**

Mission 2: Promote Ecotourism



Mission 3: Track Down Illegal Poachers

1. Description: There are three Base Card locations. The robot completes designated actions to locate illegal traps, track poachers' footprints, disrupt a poaching group, and finally raise a victory flag. The red and blue Base Card actions must be completed before the green Base Card is unlocked.



Mission 3: Track Down Illegal Poachers

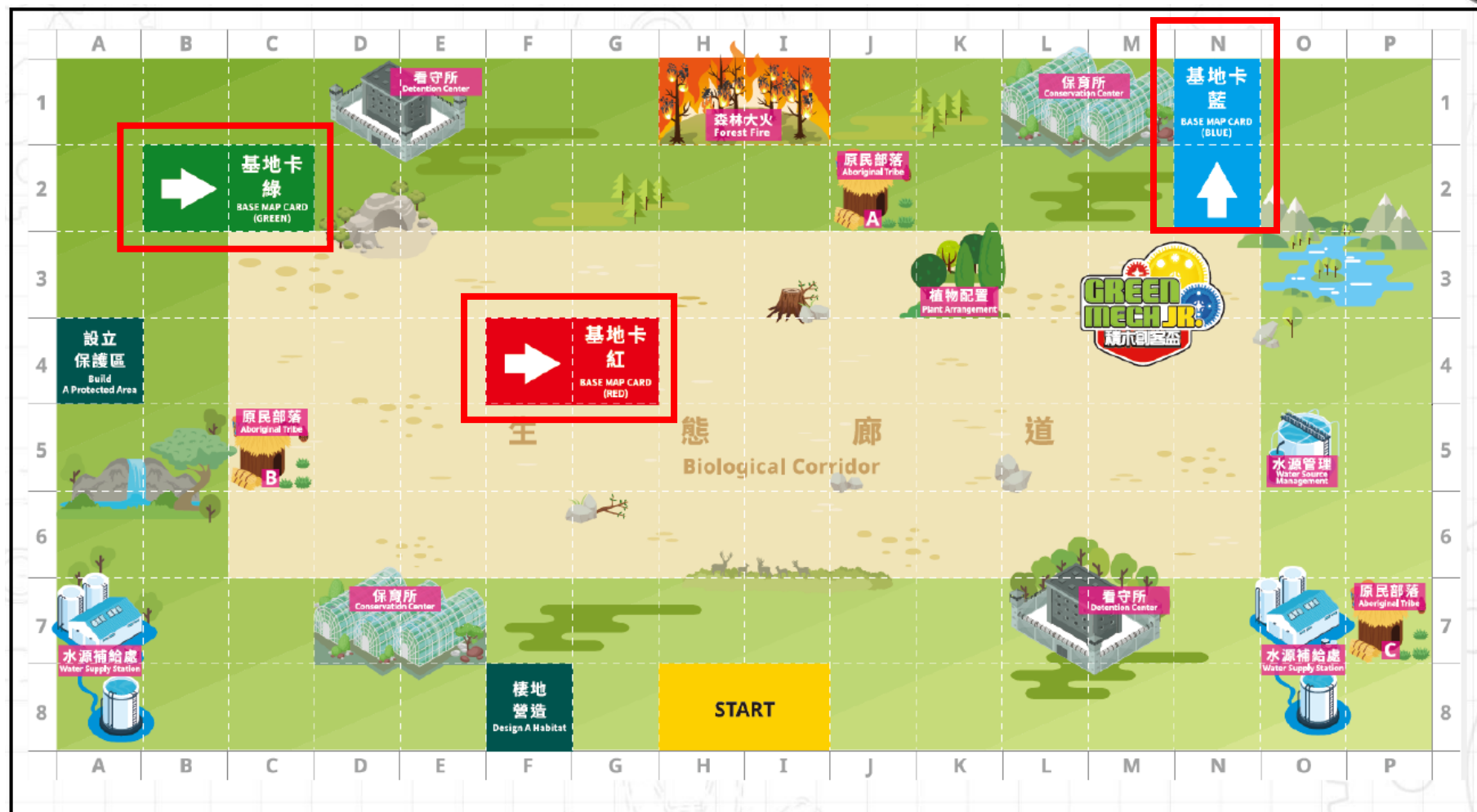
2. Scoring:

- (1) **Red and Blue Base Cards:** Create a flashing red-light or blue-light emergency effect (2 points) and perform **at least two consecutive vertical hammering motions** (5 points).
- (2) **Green Base Card:** Turn on a green light (2 points) and **use a self-built mechanism to raise the flag**. Any upward vertical movement qualifies (5 points).

[For the Green Base Card Mission only, teams may bring scissors, cotton string, double-sided tape, and similar tools to prepare the flag. These tools may not be used for any other Mission.]

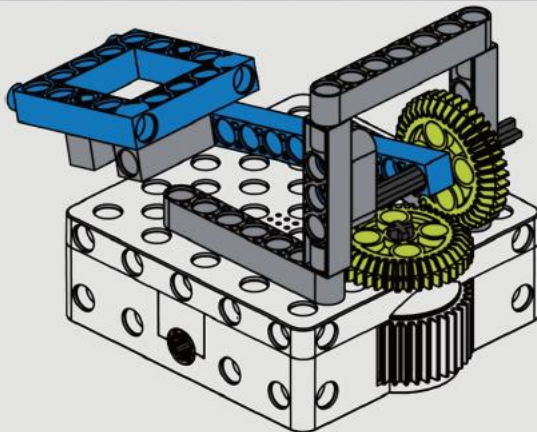


Mission 3: Track Down Illegal Poachers



Mission 4: Fight Forest Fires

1. Description: The robot must obtain water from a Water Refill Station, travel to the Forest Fire Area, and release the water to extinguish the fire. Water is represented by a 4 × 4 cm building block.



Water-transport mechanism example for reference;
teams may create their own design.



Water block illustration



Mission 4: Fight Forest Fires

2. Scoring:

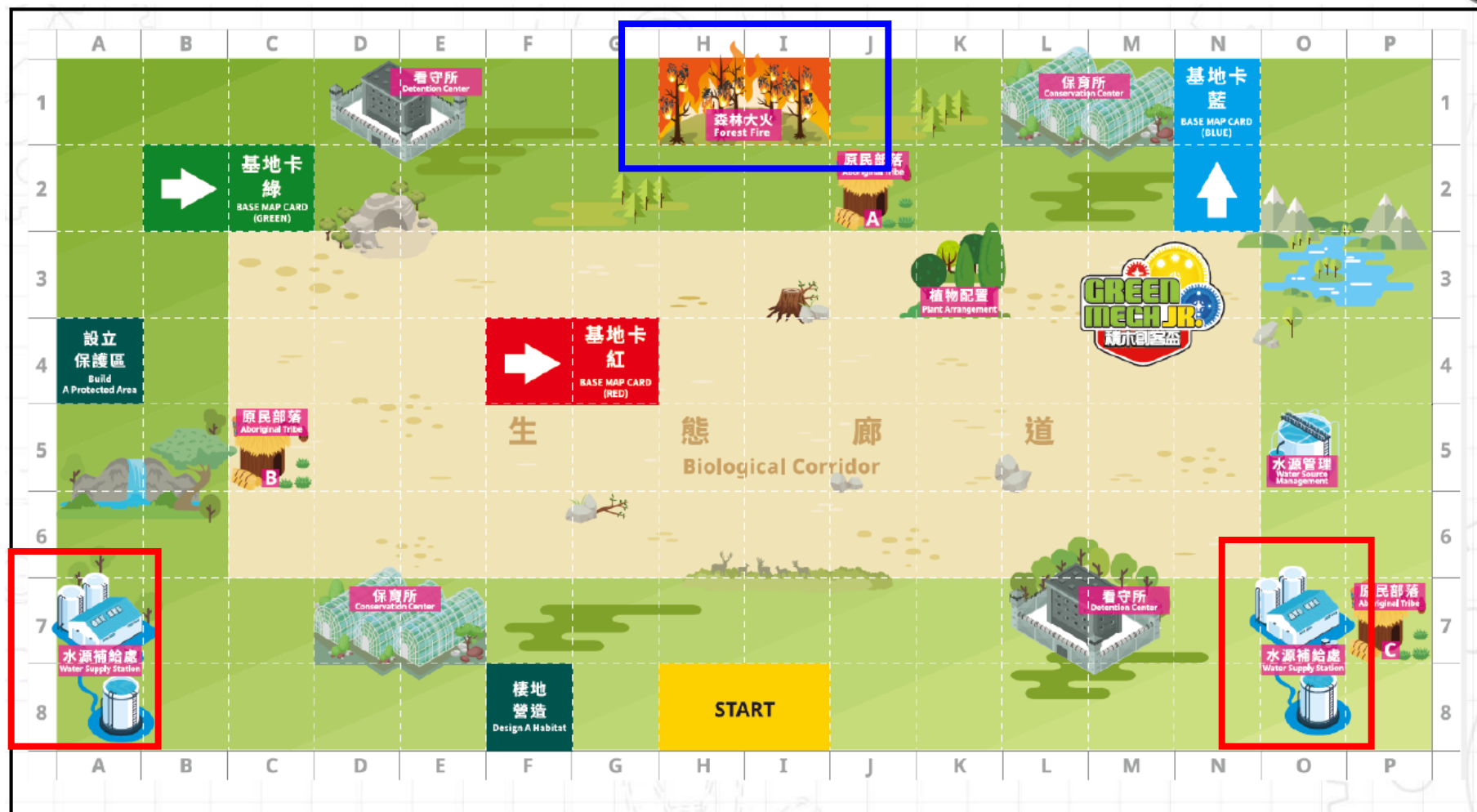
- (1) Release a water block into the Forest Fire Area. A successful delivery earns 5 points and may be repeated.
- (2) A water block may be loaded only after the robot enters a Water Refill Station. Loading elsewhere incurs a 5-point deduction each time.
- (3) If a water block falls during transport, no points are deducted, but a new block must be obtained from a Water Refill Station. Fallen or scored blocks are returned to the Station.



Mission 4: Fight Forest Fires

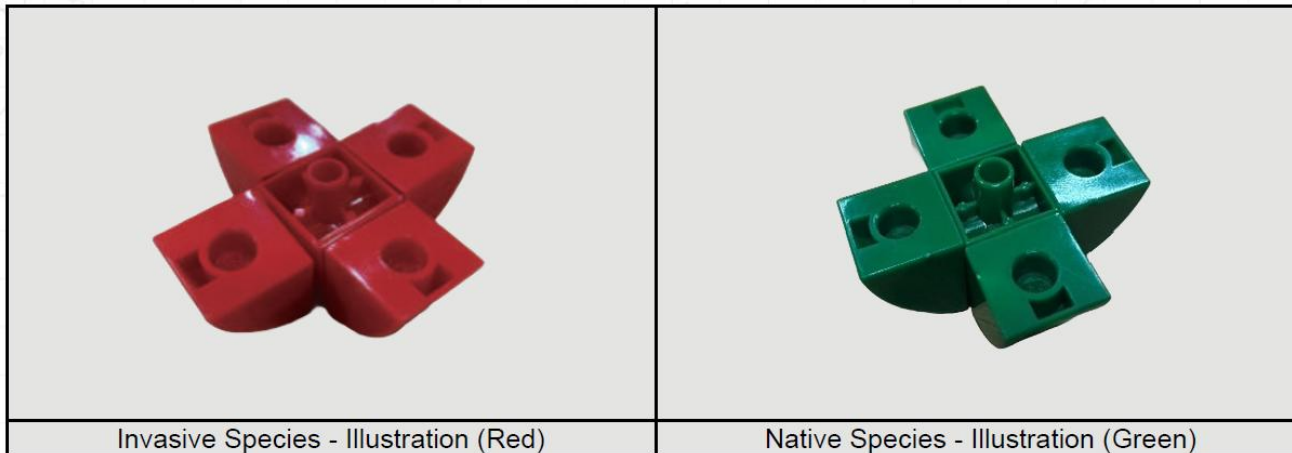
3. Deduction: If a robot enters the Forest Fire Area without a water block, 10 points will be deducted each time. The deduction may occur repeatedly, but the robot may continue the Mission.

Mission 4: Fight Forest Fires



Mission 5: Eliminate Invasive Species

1. Description: The map contains an Ecological Corridor with **invasive species represented by red blocks** and **native species by green blocks**. The robot must sort invasive species into the Detention Center and native species into the Conservation Center.

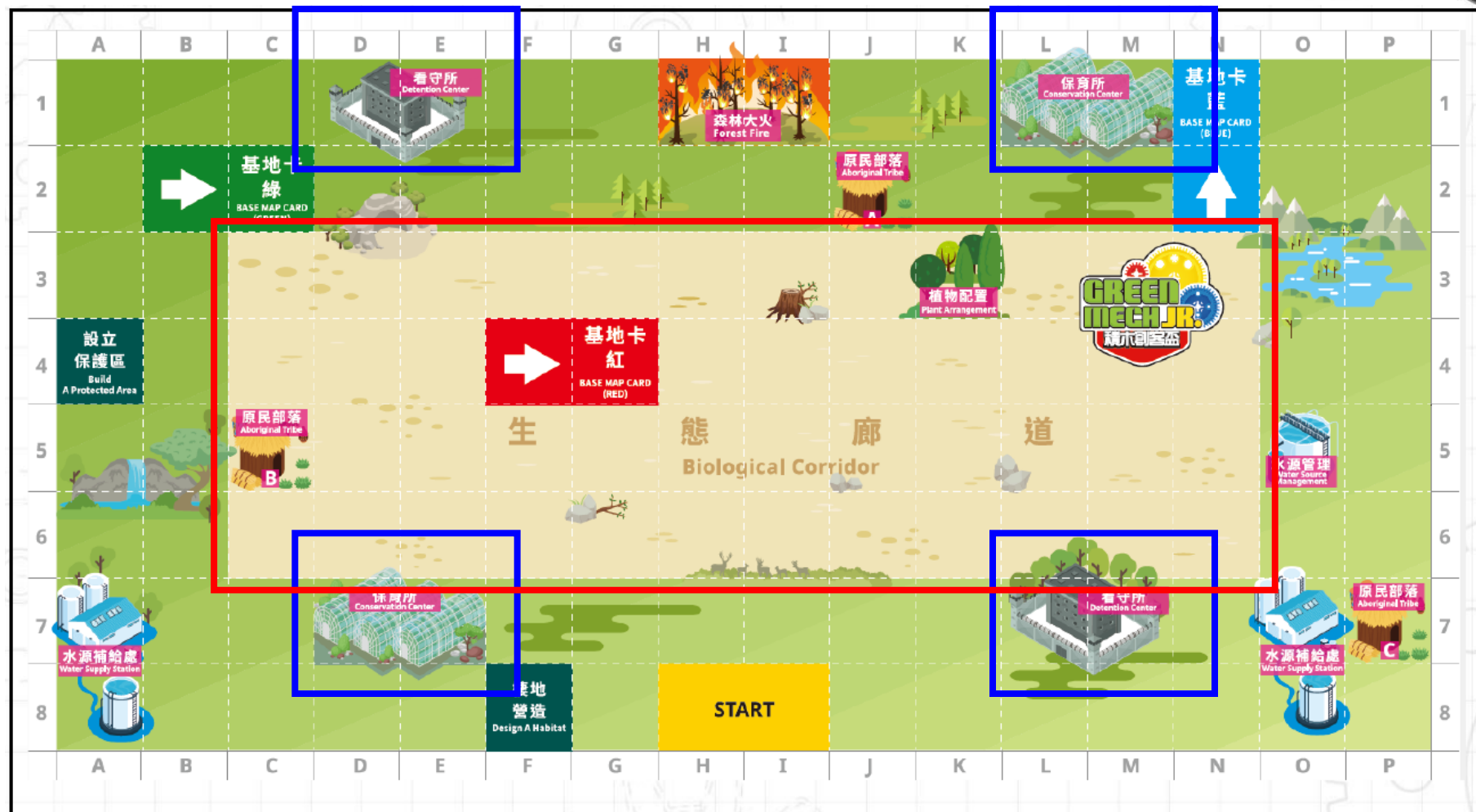




Mission 5: Eliminate Invasive Species

2. Scoring: There are initially six invasive-species blocks and six native-species blocks. Each team draws either the **Successful Conservation event** or the **Invasive Outbreak event**, adding four corresponding scoring blocks. **Each correctly sorted block earns 5 points; each incorrectly sorted block incurs a 2-point deduction.**
3. Competition Draw: Each team draws the locations of 16 invasive-species and native-species blocks from 44 positions in the Ecological Corridor.

Mission 5: Eliminate Invasive Species



【Q & A】

1. Teams not currently preparing must wait in the Team Rest Area until called by a Judge to enter the Preparation Area.
2. After completing the draw in the assigned Preparation Area, each team receives 15 minutes to prepare. Instruction Cards do not need to be disassembled, but Map Cards may be assembled on the Field only during the official 6-minute Competition Time.
3. When time expires, the points already earned become the team's Total Score.

【Q & A】

4. After drawing the designated Mission positions, each team will receive a draw diagram for practice.
5. The Judge will announce when a scoring item has scored. Participants may decide when to remove a scored target block; however, if they touch or move the robot while removing it, the robot must be retrieved immediately.
6. Scoring blocks may face any direction, but after arranging the Map Cards, each block must be placed in its original grid.

Tie-breaking

Tie-breaking Order	Criterion
1	Total Competition Score
2	Mission 5 Score
3	Mission 4 Score
4	Mission 3 Score
5	Mission 1 Score
6	Mission 2 Score
7	If teams remain tied and an award ranking cannot be determined, each tied team will draw separately and compete in a Tie-break Round using Mission 5 (Eliminate Invasive Species). Preparation Time is 3 minutes and Competition Time is 2 minutes.



Teaching Tips

Before Class

→ Form mixed-ability groups; provide one controller and one Instruction Card set per group.

During Class

→ Confirm the task and required Instruction Cards.

→ Load the program and test the controller on the map.

After Class

→ Review results, debug, and revise the program.



World GreenMech Contest
Thank You