GAR Mars Immigration-Survival Challenge
GAR Version B

1. Scope of the competition

(i) Groups. Primary school lower grade group (grade 1-3)

(ii) Number of participants. 1-2 contestants/team.

(iii) Coach. 1 person (optional).

(iv) Each person is limited to participating in 1 event and 1 team.

(v) Group determination. The local education administrative department (education committee, education department, education bureau) shall determine the grade of the contestant.

2. Competition theme

Mars, the red neighbor planet, has always carried the infinite imagination and hope of exploration of mankind. The first batch of immigrants will face this isolated and desolate planet. They will explore, build and lay the foundation for future Mars immigrants through the intelligence and technology of robots, so as to achieve sustainable survival and prosperity of mankind on this distant planet.

The theme of this robot competition is "GAR Mars Immigration-Survival Challenge". It provides an opportunity for participating teams to explore the potential of mankind in the future in space. The participating teams will show their skills and imagination in a passionate and creative way under this fascinating theme. In addition to designing and building robots, participating teams also need to demonstrate their problem-solving skills and teamwork. They must develop strategies, follow time plans, maximize resource utilization, and take

innovative approaches to solve various problems. Inspire the younger generation's interest in space exploration and encourage them to demonstrate creativity and problem-solving skills. Through this competition, they have the opportunity to experience the fun of scientific discovery and technological innovation, and inspire their passion to explore the unknown and advance humanity.

3. Competition Environment

(I) Programming System: Primary school lower grade group uses Microbrain programming.

(II) Programming Computer: Contestants must bring their own laptops for the competition and ensure that the laptops are fully charged during the competition (mobile charging devices can be provided).
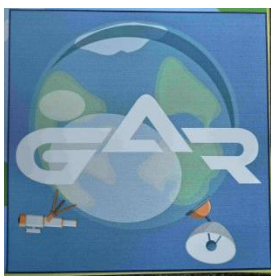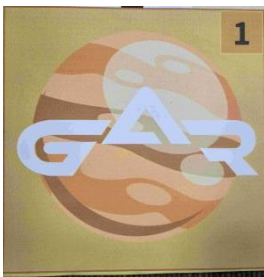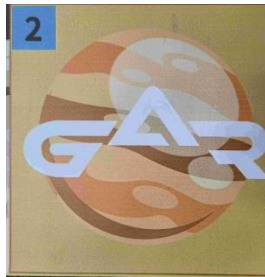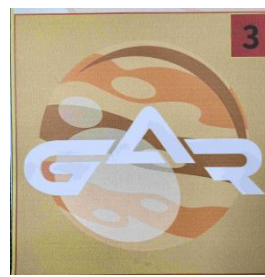
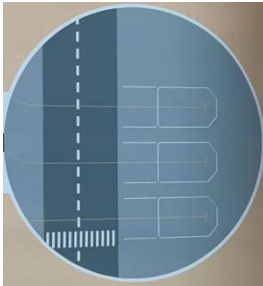(III) Prohibited Devices: USB flash drives, mobile phones, tablets, intercom, etc.

(IV) Competition Venue:
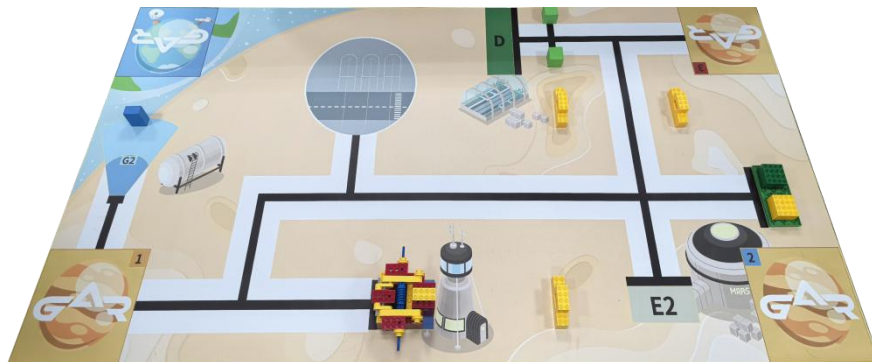
Field map

(1) The dimensions of the venue are 240cm length x 120cm width.

(2) The dimensions of the four bases are 30cm length x 30cm width.

(3) The specific dimensions of the actual competition venue, marking points, and props materials, dimensions, and weights shall be subject to those provided on site.

Earth base	Earth base 1	Earth base 2	Earth base 3

Transfer Area

The robot can start from any base. During the competition, the participating team can adjust the structure and program of the equipment in any base, or temporarily store the prop modules of certain tasks; if the participating team members touch the robot outside any base, it will be recorded as a restart. The robot can return to any base autonomously, which is not counted as a restart.

Restart means that the robot is manually returned to the base during the competition; there is no limit to the number of restarts within a single round of competition; the scores of the tasks completed before the restart are still valid. If there is no score but the task model has changed its initial state, it cannot be manually restored.

4. Competition Equipment

4.1.　Each team has one robot.

4.2. The maximum length, width and height of the robot before startup is 30cm*30cm*30cm, and the size of the robot after startup is not limited.

4.3.　Each robot is limited to 1 micro-brain controller. The total number of interfaces on

a single controller is 4, of which 2 motor interfaces, 2 sensor interfaces, and 23 programming buttons on the controller body.

4.4. The robot must have its own independent battery. The battery is not allowed to be fixed by screws or electric welding. The battery voltage is 3.7V.

4.5. The robot structure must be built with plastic building blocks, and the building blocks must use the 8mm building system.

4.6. 3D printing or laser cutting shall not be used to make structural parts, transmission parts, and minimum unit shells.

5. Competition Tasks

Task 1: Landing on Mars

Landing on Mars from Earth requires several months of waiting until the distance between the two becomes closer. The robot is considered successful when it moves from the Earth base to the vertical projection contact transfer area and emits two "beep" sound prompts. This task is 20 points.

| Task initial status | Task success status |
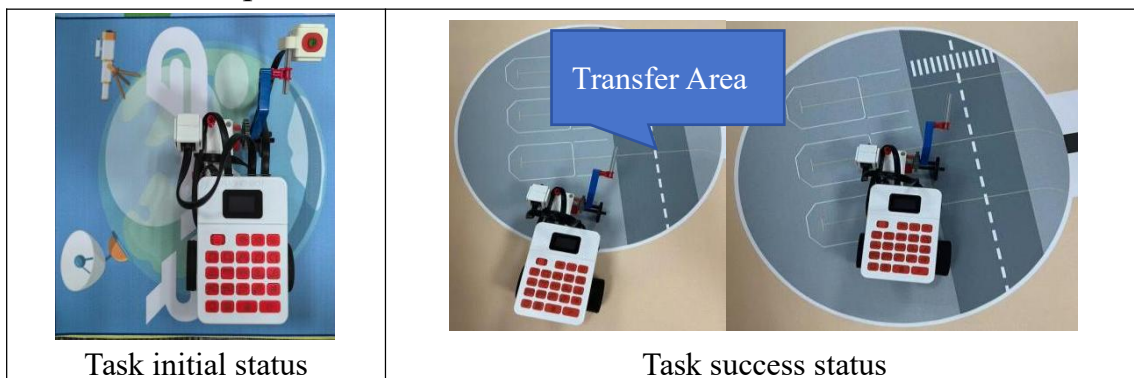
Task 2: Oxygen preparation

The oxygen on Mars accounts for about 0.15% of the Martian atmosphere. More oxygen needs to be prepared for human survival. The robot can start from any base and carry chemical substances to the oxygen preparation device in Area C. There are two chemical substances in total. Each successful placement will score 10 points. The chemical substance

model must touch the bottom plate of the oxygen preparation device. The chemical substance model that has been taken out of the base cannot be manually brought back to the base. The maximum score for this task is 20 points.

| Chemical substances diagram | Task initial status | Task success status |
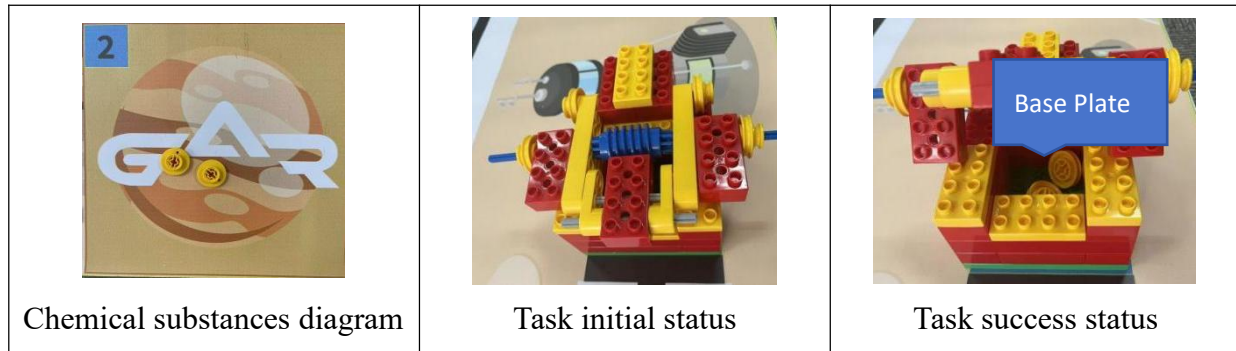
Task 3: Space Planting

To survive on Mars, nutrients are necessary. Space seed models are fixed in areas D1 and D2 of the venue. The robot needs to transport the designated space seeds to the space planting room in area D, and the vertical projection is completely within area D to be successful. This task is 30 points.

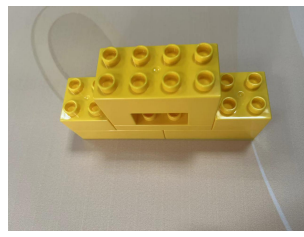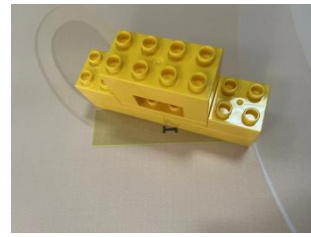| Task initial status | Task success status | Task unsuccessful status |
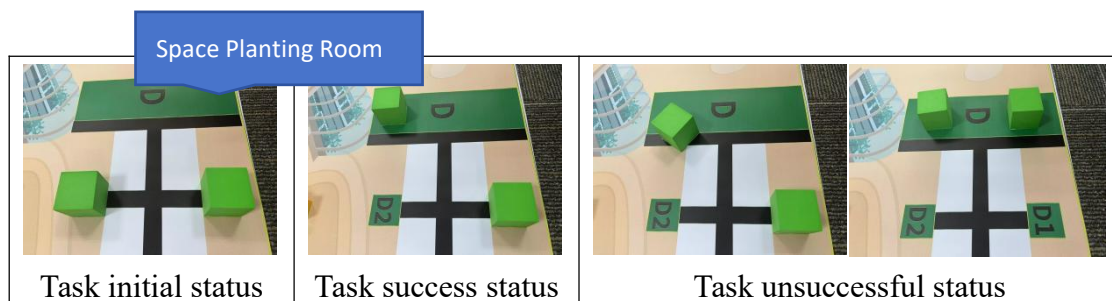
Task 4: Avoid rocks

There are many rocks on Mars that make the ground uneven. Rock models are placed in areas I1, I2, and I3 of the venue. After the robot finishes the game, if the rock model is not moved or damaged and the vertical projection is completely in area I, the mission is successful. Each rock model is 10 points, and the maximum score for this mission is 30 points.
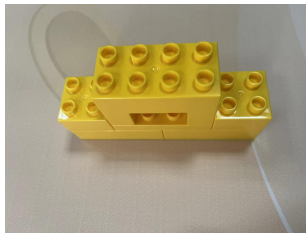
| Task initial status	Task success status	Task unsuccessful status

Task 5: Urban Construction

The construction of a city on Mars requires local materials, and the materials collected on Mars are made into bricks to build houses. An open-pit mine model is fixed in the E1 or E2 area of the airport, and a yellow brick model and a green ore model are placed in the model. The robot must separate the brick model in the open-pit mine and make the vertical projection completely detach from the base, and the vertical projection of the ore model must not detach from the open-pit mine base to be successful. If the vertical projection of the ore model detaches from the open-pit mine base, no points will be awarded. The maximum score for this task is 30 points.

Base plate

Task initial status	Task success status	Task unsuccessful status
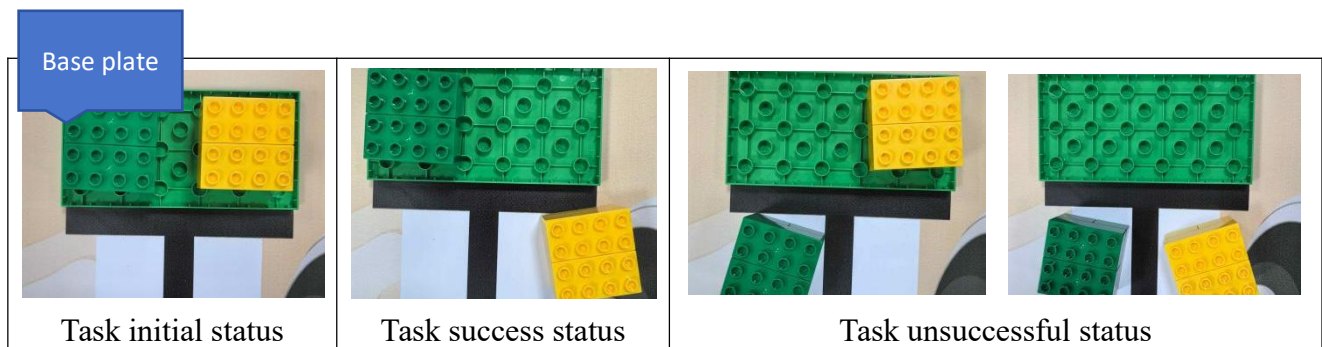
Task 6: Water detection

There are underground liquid water lakes and water ice on Mars, and water resources need to be obtained through exploration. The robot explores the designated location of purified water resources in G1 & G2 areas, which are drawn by the referee before debugging. It will score 10 points if it stops after the vertical projection touches the corresponding area, 10 points if the green light turns on, and another 10 points if the robot's vertical projection completely returns to the Mars base. The maximum score for this task is 30 points.

Task initial status	Task success status
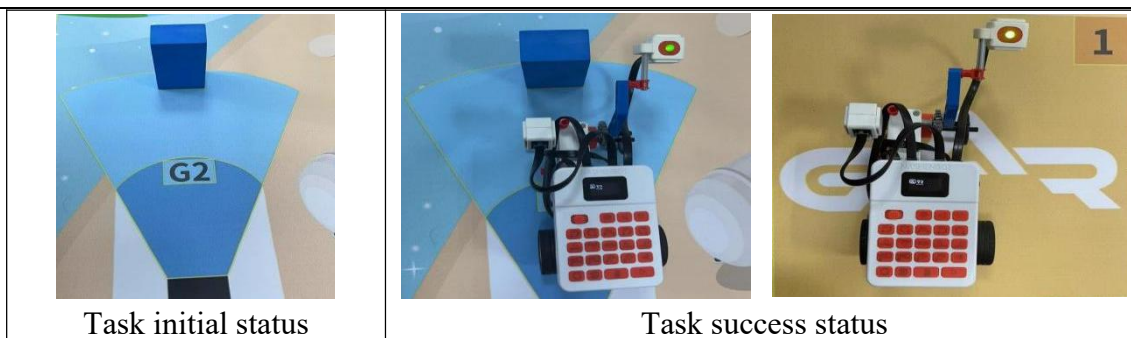
Attention:

(1) All variables are determined before the start of the competition;

(2) Space planting: the model to be transported is selected from D1 and D2;

(3) Water detection: the initial position of the model is selected from G1 and G2;

(4) Urban construction: the initial position of the model is selected from E1 and E2.

6. Time and frequency

Group	On-site programming and debugging time	Task duration	Task frequency
Primary G1-3	Determined by on-site organizing committee	180s/times	2 times

1. On-site programming and debugging time: During this time, all participating teams in each group will perform programming and debugging uniformly.

2. Specified task time: The start and end time specified by the robot to complete the competition. If the competition is not completed within the specified time, the competition will be forced to end.

7. Competition Process

(I) Check-in

1. Each team should enter the designated venue at the time specified in the competition schedule and check-in at the entrance of the competition venue. During the check-in, the referee will check the equipment and devices (such as laptops) carried by each team according to regulations. It is strictly forbidden to bring USB flash drives, mobile phones, intercoms, telephone watches and other communication equipment into the venue.

2. During the check-in, the participating teams can bring the entire robot into the venue, but they must pass a comprehensive inspection to ensure that they comply with relevant regulations. The contestants should make repairs and improvements to the parts that do not meet the regulations, and can only participate in the competition after passing the re-inspection.

3. The participating teams that pass the check-in can enter the preparation area.

4. Within the specified time, the participating teams that fail to check-in will lose the qualification to compete.

(II) Drawing and debugging

1. The judge summons the representatives sent by the participating teams entering the preparation area to draw lots to determine the location of the task model, etc. The results of the draw will be announced to all participating teams immediately.

2. The participating teams have at least 60 minutes to build the robot and debug the program before the start of the first round. After the first round, there is at least 30 minutes for the second round of debugging. The specific duration of the competition debugging will be adjusted by the referee team according to the actual situation and announced to all

participating teams before each round of debugging.

3. Participants need to line up in an orderly manner according to the order of the competition venue for programming and debugging. Participants who do not follow the order may be disqualified.

4. After the programming and debugging, all participating teams must place the robots in the designated location of the referee for storage. Participants are not allowed to touch the robots without permission, otherwise they will be disqualified.

5. After the referee signals the start of the game, the participating teams that are still not ready will lose the opportunity to compete in this round, but will not affect the next round.

(III) Pre-match preparation

1. After receiving the notification to enter the competition area, the participating teams should pick up their robots in the robot storage area and then enter the competition area under the guidance of volunteers.

2. At the designated competition venue, the participating teams have 1 minute of pre-match preparation time.

3. Before the end of the pre-match preparation time, the participating teams should put their robots in place in the starting area. The robots can be powered on, but no visible movements are allowed.

8. Run and End

(I) Robot operation

1. Robot startup and operation mode: The robot must be stationary before the base is started. It is allowed to start by "pressing a button". The robot must run autonomously after starting. Once the robot is started, the team members are not allowed to touch the robot

(except for restarting).

2. No pause within the time limit for completing the task.

3. Within the time limit for completing the task, if the structure of the participating robot falls off, the contestant can retrieve the fallen parts by himself without affecting the normal operation of the robot.

4. The robot cannot be replaced during the competition (it is allowed to replace the functional structural parts required for the task), and the robot software cannot be changed.

5. The referee determines the order of the contestants on site.

(II) End of the game

1. Complete all tasks within the specified time.

2. The total duration of a single round of competition is 180 seconds. When the time is up, the referee blows the whistle to end the game.

9. Evaluation Standards

(I) Score calculation

1. After the competition, the score is calculated based on the final completion status of the task.

2. If only part of the task is completed within the specified time, the score is calculated based on the task actually completed.

3. The final total score of the participating team is the sum of the scores of two rounds.

4. The highest score of the two times is taken. The one with the higher score ranks higher. If the scores are the same, the one with less time ranks higher; if the scores and time are the same, the one with fewer restarts ranks higher.

(II) No awards

1. The contestant is more than 10 minutes late.

2. The contestant deliberately damages the competition venue.

3. The contestant does not follow the instructions of the referee (judge).

4. Multiple teams share a robot.

5. The contestant's competition score is zero.

6. The contestant is complained and the complaint is established.

7. The contestant participates in multiple events.

8. The robot is remotely controlled after it is started.

10. Related instructions

1) Each contestant is limited to one event. Duplicate or false registration is strictly prohibited. Once discovered or reported, the contestant will be disqualified.

2) Contestants can form teams from the same school or from other schools within a prefecture-level city. Teams from other provinces or prefecture-level cities are not allowed to register for the competition. Once discovered or reported, the contestant will be disqualified.

3) These rules are the basis for the implementation of refereeing work. During the competition, the referee (judge) has the final decision. All matters not stated in the rules shall be decided by the referee team.

GAR Mars Immigration (Survival Challenge)

Score Sheet for Primary school lower grade group (grade 1-3)

Name: Contestant 1: Contestant 2: Contestant 3:			Group:	
	Tasks	Score	Round 1 Scoring	Round 2 Scoring
1	Landing on Mars	20		
2	Oxygen preparation	10*2		
3	Space planting	30		
4	Avoid rocks	10*3		
5	Urban construction	20		
6	Water detection	10+10+10		
	Time	180 seconds		
	Total score			
	Restart times			
Team signature			**Judge Signature**	