

Curling Challenge Rule

Introduction: A simulated curling competition event. A remote-controlled robot carries and throws curling stones so that they can accurately stop in the high-scoring area.

Group: ≤3rd grade

1. Robot requirements

1.1 Dimensions and weight restrictions

- A. The size of the robot is less than 20cm in length and less than 20cm in width. There is no limit on height and weight. The robot can be unfolded after the competition starts.
- B. During the competition, the team members place the robot in the starting area. The vertical projection of the robot cannot exceed the starting area. If it exceeds the starting area, a maximum of 5 minutes of structural adjustment time will be given. If the adjustment is not completed, the robot will be disqualified.

1.2 Robot equipment requirements

- A. No restrictions on any robotic devices. However, robotic equipment cannot damage the playing field.
- B. Because the participating team members are young and considering safety issues, it is necessary to limit the initial speed of the curling stone. If the referee determines that the robot may cause harm to the human body, the referee has the right to terminate the game and require the players to modify the program or structure.

2. Competition rules

2.1 Competition venue standards

- A. The competition venue is a wooden car sticker with a layout (as shown in Figure 1). The venue contains two curling tracks. The two tracks are isolated by a barrier. Each track is 240cm long and 50cm wide.
- B. The size of starting areas 1 and 2 of the venue track is 20cm*20cm, the size of the throwing area is 30cm*50cm, the distance of the curling skating area is 90cm, the scoring area is 50cm*50cm, and the ring diameters are 10cm, 20cm, 30cm, and 40cm respectively. The size of the buffer zone is 10cm*50cm, and the initial position of the curling stones is a circle with a diameter of 4cm, with a total of ten curling stones per track.
- C. The platform support length is 2.4 meters, the width is 1.2 meters, and the height is 0.4 meters.

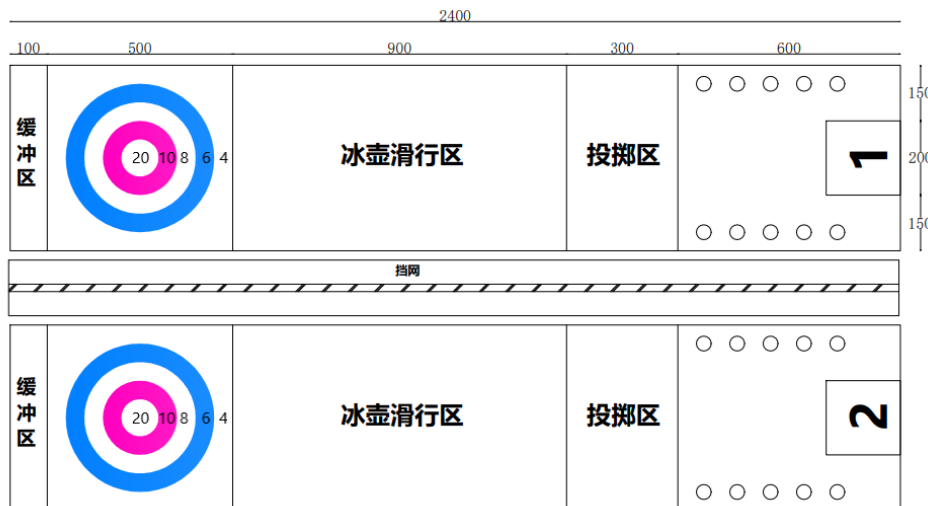


Figure 1: Competition venue

2.2 Venue props

Curling stones on the field, the colors of the curling stones on the two tracks are random red and blue, and the colors of the curling stones on the same track are the same. The curling stones are made of acrylonitrile plastic (40mm diameter, 20mm height, weight about 10g), with slightly rounded edges (such as Make it yourself, 3D printing is recommended).

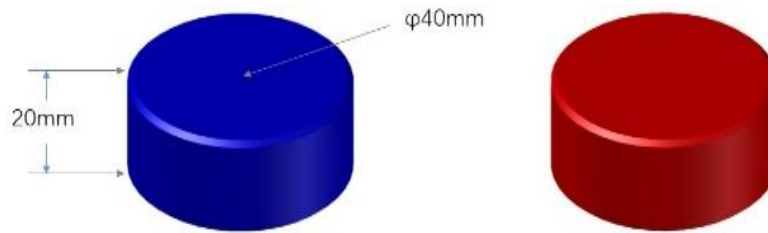


Figure 2: Curling example

2.3 Time limit

Each team can play for a maximum of 5 minutes per round. When the 5 minutes are up, the game will stop immediately and the scores will be totaled.

2.4 Competition rounds

- A. The competition debugging time is 30 minutes. After debugging, prepare for the competition. During the competition, each team will have 2 rounds of timed competition, and the two rounds will be conducted consecutively.
- B. All teams will be ranked based on their best results in two rounds. If the scores are the same, they will be ranked based on the remaining time.
- C. If the best scores in the two rounds are the same and the remaining time is the same, the ranking will be based on the scores in the other round.

2.5 The game starts

- A. Before the referee's whistle blows, the players of both teams place the robots in the starting area frame of their respective tracks on the stage, and the vertical projection of the robot must be within a 20cm*20cm frame. The remote control is placed next to the starting area, and the referee whistle. When the sound sounded, the players picked up the remote control and started the game.
- B. At the end of the game, the players operate the robot to throw the last curling stone, and the game timer stops.

2.6 Violations

- A. After the game starts, team members are not allowed to touch the robot, otherwise they will be disqualified from the current round.
- B. During the competition, the curling stone needs to slide on the playing surface to the scoring area during the throwing process. It is not allowed to reach the scoring area from the air. Otherwise, it will be regarded as a violation and the results of this round will be cancelled.
- C. During the game, the robot carries its own curling stone to the throwing area for throwing. Instructions for correct throwing: the vertical projection of the robot must not exceed the black line between the throwing area and the sliding area, and part of the vertical projection of the robot must enter the throwing area. Curling stones thrown incorrectly are invalid and will not count.
- D. During the competition, the robot cannot affect the opponent's track competition, otherwise it will be disqualified from this round of competition.
- E. During the competition, the robot falls off the stage, the round ends, the total points are totaled, and the remaining time is 0.

2.7 Scoring Rules

- A. Curling stones thrown in the curling skating area and buffer area will be counted as 0 points.
- B. The scores in the curling scoring area from the inner ring to the outside are 20 points, 10 points, 8 points, 6 points, and 4 points.
- C. Curling stones that fall off the table will be counted as 0 points.
- D. If the curling stone comes to rest at the junction of two scoring areas, the area with the higher score will be scored.
- E. If the curling stone is stationary at the junction of the sliding area and the scoring area, or the junction of the buffer area and the scoring area, it will be regarded as 0 points.

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Curling Challenge Score Sheet

project	count	Point Value	Score
1. The number of curling stones for 20 points		20	
2. The number of curling stones for 10 points		10	
3. The number of curling stones for 8 points		8	
4. The number of curling stones for 6 points		6	
5. The number of curling stones for 4 points		4	
Total Score			
time left:			