

# Billiards Game

## Rulebook



# Billiards GameRules



## 1. Introduction:

The Robotics Billiards Game is a competitive, billiards-inspired robotics match where two teams use remote-controlled robots to pocket assigned balls on a shared field. Each team must pocket seven assigned balls before attempting to pocket the shared 8 ball. The first team to pocket all its balls, including the 8 ball, wins the game.

## 2. Team Composition:

- **Team Size** : 3 : 5 people guided by a Coach.
- **Team age** : For ages 6 - 8, using **WeDo** or **Spike Essential** kits.

## 3. Game Field

- **Dimensions**: The game field is a rectangular table measuring 120 cm X 160 cm.
- **Pockets**: **Six pockets** are positioned around the field, similar to a billiards table layout, with one pocket in each of the four corners and two at the midpoints of the long sides. Each pocket will have a diameter of **10 cm**.
- **Ball Setup**: At the start, **15 balls** are arranged in a triangular formation in the center of the table. Each ball has a **diameter of 5 cm**, similar to the balls in a **Duplo kit**
- **Team Balls**: **14 balls**, divided equally and color-coded for each team (**7 per team**).
- **8 Ball**: **One shared** ball, placed at the center of the formation, which must be pocketed last.

## 4. Robot Specifications

- **Kit:** Only **WeDo** kit or **Spike Essential** kit are allowed.
- **Size:** Robots must fit within (specify dimensions, e.g., **20 cm x 20 cm**) at the start of the match.
- **Weight:** Robots cannot exceed (**1.5 kg**).
- **Control:** Robots will be **remote-controlled** throughout the match. No autonomous actions are permitted during gameplay.

## 5. Game Setup and Start

- **Starting Position:** Robots start at opposite ends of the field.
- **Ball Break:** At the start signal, both teams' robots simultaneously move towards the ball formation in the center to break up the balls, just like in billiards. After the break, each team works to pocket their assigned balls.
- **Objective:** Each team must pocket all its assigned balls before attempting to pocket the 8 ball. The team that completes this first wins the game.

## 6. Gameplay Rules

- **Remote Control:** Players may control their robots to move, hit, and aim for their assigned balls at any time.
- **Ball Pocketing:**
  1. Teams are only allowed to pocket their assigned 7 balls before going for the 8 ball.
  2. The 8 ball becomes **active only** after all a team's assigned balls are pocketed.
- **Order of Play:** Both robots are active and can move simultaneously. Blocking or strategic positioning to prevent the opponent from pocketing balls is allowed, but excessive or aggressive contact is prohibited.
- **Premature Pocketing of 8 Ball:** If a team pockets the 8 ball before all its assigned balls, **they receive a foul**. On the first offense, **the team must wait 5 seconds before resuming play**. The same penalty applies for a second offense. However, if the team pockets the 8 ball prematurely a **third time, they forfeit the match**.

## 7. Scoring

### 1. Scoring Criteria:

- **Pocketing a Team Ball:** No points are awarded for pocketing a team ball, but all assigned balls must be pocketed to win.
- **Pocketing the 8 Ball:** If a team has pocketed all its assigned balls, successfully pocketing the 8 ball wins the game.
- **Premature Pocketing of 8 Ball:** If a team pockets the 8 ball early, they receive a **5-second** delay before resuming play on the first and second offenses; a **third offense results in a loss of the match.**

### 2. Time Bonus Calculation:

Points will be awarded based on the total number of correctly pocketed balls, the control mode used, and the completion time.

- Points awarded based on completion time are calculated using the formula :  
Time Bonus =  $(T/300) * \text{Total Points}$ .
- Where **T** is the remaining time in seconds (Maximum time is **300 seconds**).
- **No time bonus** will be awarded if the robot does not complete all required ball placements in their designated pockets.

### 3. Example of Total Points Calculation:

**Suppose** a team successfully pockets **7 balls** in their correct pockets and the **8 ball**, completing the task with **120 seconds** remaining. (**Note the total balls in this example is 7, plus the 8 ball.**)

- **Points for Ball Placement:** 7 balls x 5 points = 35 points
- **Points for 8 Ball:** 1 ball x 10 points = 10 points
- **Time Bonus:** Calculated based on the remaining time, with 120 seconds factored in according to the scoring formula: Time Bonus =  $(120/300) * 45 = 18$  points

Total Score: **Ball Placement + 8 Ball + Time Bonus** = 35 + 10 + 18 = 63 points

## 8. Match Duration

- Each match is limited to a maximum of **5 minutes**.
- If neither team has pocketed all balls within the time limit, the team with the most pocketed balls **wins**.
- If tied at the end of the time, the game proceeds to a **2-minute** overtime. If still tied, the game ends in a **draw**.

## 9. Fouls and Penalties

### - Fouls:

1. Excessive or damaging contact with the opponent's robot.
2. Pocketing the 8 ball before pocketing all assigned balls.
3. Manually interfering with any robot or balls during the match.

### - Penalties:

1. For each foul, the opponent may place one of their pocketed balls back on the table, with a **5-second delay** before play can resume.
2. Repeated or severe fouls may result in **disqualification**.

## 10. Safety and Fair Play

- All robots must be safe and secure, with no sharp or dangerous parts.
- Respectful play is expected. Aggressive behavior or unfair interference is discouraged to maintain a positive competitive environment.

**Note: To download the playground ready for printing click this link:**

[https://drive.google.com/drive/folders/1ci\\_0ra0Ebq8TgfJn4ST2Mha56yMsFXe\\_?usp=sharing](https://drive.google.com/drive/folders/1ci_0ra0Ebq8TgfJn4ST2Mha56yMsFXe_?usp=sharing)

**Note: To download the STL file for printing the ball, click this link:**

<https://drive.google.com/file/d/1locvxdPzZmibuwbGuNF0as3NHtJeBaUP/view?usp=sharing>

