

RoboQuest Jr.



Overview

In the futuristic year, advanced robotic systems are used to explore unknown terrains and collect valuable resources. To inspire young engineers, Kr8ivity League introduces the Gem Collector Challenge.

Teams must design robots capable of identifying, collecting, and depositing different types of gems.

The competition consists of multiple stages, each with distinct objectives

1. **Mentoring Round:** A mentoring session will be held for all participants via ablskool.com (LMS) to understand more about the event and rules. Interested participants can also opt for Online mentoring (Optional) to refine their projects with expert guidance.
2. **Zonal Round:** In this round students will showcase their skills by gaining maximum points in the allotted time.
3. **Finale:** The top 20% teams with maximum points from each zone advance to compete in the grand finale.

Problem Statement

In the Robotic Gem Collector Challenge, each team must design and operate a single manually controlled robot known as the Gem Collector. This robot will be

responsible for collecting colored gems (blocks) and placing them into designated collection zones.

Your robot should be capable of the following:

- Picking gems (colored blocks).
- Moving around the arena quickly for bonus points!
- Depositing gems correctly into designated zones.

Rules and Regulations

- Students from Grades 6 to 8 can participate in this competition.
- Each team can have a maximum of 3 participants.
- The Gem collector robot must be wirelessly controlled using the RoboQuest controller and its remote.

To ensure fair play and adherence to competition standards, the Gem Collector Robot must meet the following specifications:

Control & Navigation

- The robot must be manually navigated by the operator without any autonomous features.
- Only one RoboQuest Controller and its remote is allowed for programming and control.

Motion & Mobility

- The robot must use BO DC motors with a maximum speed of 200 RPM (tested on a tachometer).
- It must efficiently collect gems scattered in the arena and place them in the correct zones.
- The robot must not cause damage to the arena, props, or other objects.

Size, Weight & Electrical Constraints

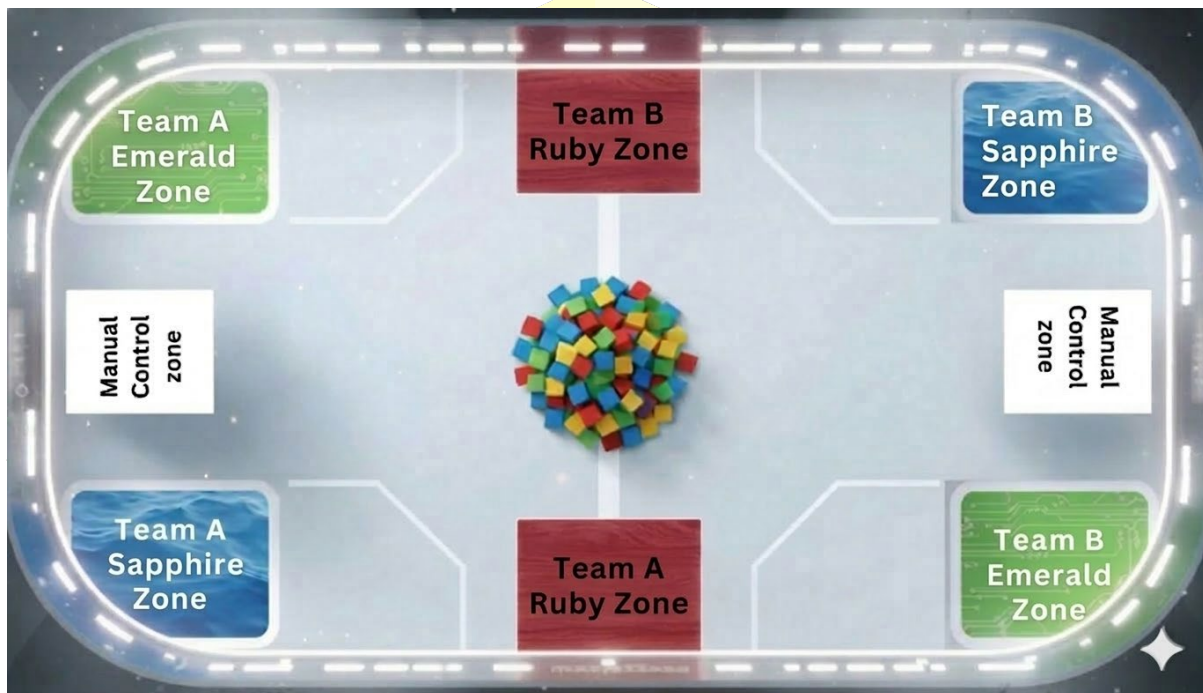
- The robot must follow all size, weight, and electrical specifications.
- The main part of the robot's dimensions must not exceed 25 cm x 25 cm x 20 cm (L x W x H) during the initial inspection, excluding the robotic hand but including the wheels. However, the bot can extend its size once the run begins. A tolerance of $\pm 5\%$ is allowed.
- AC power supply will not be provided or allowed during the competition.
- The battery used for the robot should not exceed 12V.
- Maximum weight: 1.5Kg
- Wheel Specifications and Restrictions:
 - Maximum overall diameter: 8 cm and Maximum width: 2.5 cm
 - Omni-directional wheels are not allowed.

Game-Specific Constraints

- The Robot must start from the designated Start Zone and return to the same zone after completing its task.
- If a gem falls outside the arena, points will be deducted.
- The robot must not interfere with any arena elements or props.
- To be eligible for bonus points, the robot must complete all tasks within the 5-minute time limit.

Guidelines

Arena



- The game will take place in a 240 cm × 340 cm 8 ball pool-style arena.
- The Gem Collector Robot starts from the Manual Control Zone.
- Gems are placed at the center of the arena.
- Each gem must be deposited into the correct collection zone.

Game Rules

- Time Limit: The entire match lasts 5 minutes.
- Team must start from the Manual Control Zone.
- Robot collects gems using a robotic arm and deposits them in correct zones.

Scoring System:

- Each gem has specific points when placed correctly.
- Bonus points for early completion.
- Sharing robots between teams is strictly prohibited.

Evaluation Criteria

Step	Challenge	Points to Win
1	Race against Time!	• First 5 gems in under 1 minutes: 30 bonus points! • First 5 gems in under 2 minutes: 20 bonus points! • First 5 gems in under 3 minutes: 10 bonus points!
2	Place your blocks!	• Red Gems→Ruby Zone: 5 points • Blue Gems→Sapphire Zone: 10 points • Green Gems→Emerald Zone: 15 points • Yellow Gems— Dummy Gems: 0 points • Gems incorrect placement: 0 point
3	Watch Out for Mistakes!	• Throwing gems outside arena: -5 points per gem • Contact with opponent robot: -5 points (added to opponent) • Not returning to start zone: -20 points
4	Special Bonus Fun!	Completing all tasks with no penalties: +10 bonus points