

RoboHacks 2025 – Technical Challenge

The Mount Royal Revival Project: An Autonomous Reforestation Mission

Participants will design and program an autonomous robot to assist in reforestation efforts on Mount Royal. The goal is to navigate mapped terrain, identify suitable planting zones, and drop seeds only in designated areas, all while avoiding restricted zones. The challenge simulates real-world reforestation efforts and encourages sustainable engineering.

Mission Objectives

- Navigate autonomously through a marked area
 - Identify correct planting zones using sensors
 - Deposit seeds accurately in viable locations
 - Avoid restricted areas to prevent ecological damage
 - Optimize sustainability in materials, efficiency, and design
 - Optional bonus: Visit the lake zone to simulate collecting environmental data
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Rules & Constraints

- The robot must operate autonomously once started.
 - Color sensors must be used to distinguish planting zones (green and blue) from restricted areas (red).
 - The robot must drop two seeds per valid zone without spilling.
 - No external assistance (physical or remote) is allowed once the robot starts its run.
 - Participants must document their sustainability choices, including materials used and energy efficiency.
 - The judged run cannot last more than 10 minutes or the team will face disqualification.
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Scoring Breakdown

Category	Criteria	Points
Performance	Completed course by following the line	10 pts
	Movement (smooth, controlled motion)	5 pts
	Color calibration (tested before the run)	5 pts
	Correct seed drop location (5pts per middle, 2pts per outer zone)	Variable
	Even distribution of seeds	5 pts
	Identifies zones correctly	10 pts
Sustainability	Robot weight (lighter is better, 5pts per 50g interval)	Variable
	Ease of disassembly for recycling	10 pts
	Use of exclusively sustainable materials	15 pts
	Wire management & safety	10 pts
Bonus Points	Minimal physical interaction (no manual adjustments)	5 pts
	Obstacle avoidance	5 pts
	Lake visit (10 sec stay in designated area)	5 pts
Penalties	Incorrect planting in restricted zones	-5 pts per violation

Excessive Time (above 5 minutes)

-5 pts

Physical contact with the robot

-5 pts

Attending the talk about McGill's reforestation project will give you 2 bonus points per person.

Deliverables

- Robot Demonstration – Teams will demonstrate their robot completing the mission.
 - Technical Summary – A short write-up explaining the feasibility, limitations, and sustainability aspects of their design. Teams will be asked questions on it before their demonstration.
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Materials Provided to Each Team

- 2 Power Motors
 - 1 Servo Motor
 - 2 IR Sensors
 - 2 Color Sensors
 - 1 Arduino Nano
 - 2 Wheels
 - 1 Caster Wheel
 - 9V rechargeable Battery
 - Battery Connector
 - 1 Breadboard
 - Wires
 - Optional: popsicle sticks
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Final Notes

- Sustainability is a core focus. Participants should minimize materials, optimize energy use, and prioritize recyclability.
- Robots do not have to be fully functional, but feasibility matters—unrealistic claims will not be accepted.
- The judging panel will include robotics and sustainability experts who will evaluate teams on innovation, execution, and impact.