RDL JR

2025 Official Challenge Manual

MOONBASE

2025 RDL Jr. MOONBASE - Official Field

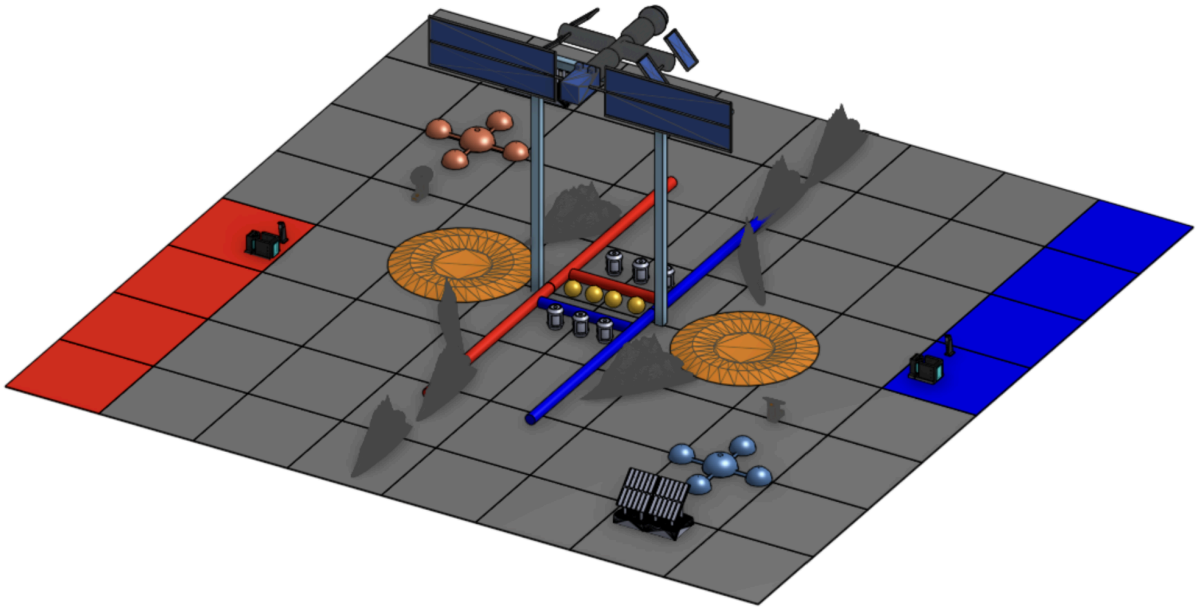

Figure 1. RDL Jr. MOONBASE Field

Three Laws of Robotics

1. *A robot may not injure a human being or, through inaction, allow a human being to come to harm.*

2. *A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.*

3. *A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws.*

~Isaac Asimov

And one more….

4. *A robot may not intentionally injure another robot unless the action or inaction conflicts with the First, Second, or Third Laws.*

~ Scooter Willis (Creator of RDL)

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Revisions Date	Page	Notes

Table of Contents

Illustrations

Introduction

Creativity and innovation are key elements to advancing the fields of science, technology, engineering, and mathematics (STEM) into the future. Robot Drone League Junior (RDL Jr.) has been designed to provide students with open-ended challenges that allow for creation and innovation by engaging in hands-on design, engineering, and programming of interactive robots and drones. Students are presented with the opportunity to develop real-world connections to classroom learning. Working with robots in a collaborative game format can be a very powerful tool to engage students and enhance math and science skills through hands-on, student-centered learning. Through participation in RDL Jr, students can develop the essential life skills of teamwork and collaboration, as well as critical thinking, project management, and communication required to become the next generation of innovators and problem-solvers in our global society. The 2025 RDL Jr. MOONBASE Challenge, presented by STREAMWORKS, is designed to inspire students to develop a lifelong passion for learning and pursuing educational and career opportunities in STEM fields by implementing real-world STEM-related problems that require innovative and critical thinking to find solutions.

For additional information, please contact:

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STREAMWORKS

Challenge Overview

RDL Jr. 2025 Challenge: MOONBASE

Establishing the Next Frontier

Dear Robot Drone League Competitors,

Welcome to the 2025 Robot Drone League Jr. Challenge: MOONBASE! This year's competition is inspired by one of the most ambitious missions in human history—the Artemis program. NASA is leading the charge to return humans to the Moon, not just to visit, but to stay. Through Artemis, astronauts will establish a permanent lunar presence that will serve as the foundation for future space exploration, including the ultimate goal: Mars.

Your challenge this season will simulate key mission tasks required to establish and sustain a functional lunar base. In the near future, Artemis astronauts will live and work on the Moon, conducting groundbreaking research, harvesting lunar resources, and testing technologies essential for deep space travel. Your team will step into their boots—using robots and drones to complete critical MOONBASE operations in a simulated lunar environment.

The Artemis Connection

NASA's Artemis program is not just about reaching the Moon—it's about staying. The lessons learned from Artemis will pave the way for future human missions to Mars, creating a blueprint for sustainable space exploration. The Gateway station, orbiting the Moon, will serve as a critical hub for lunar operations, and your challenge will include drone and robotic tasks tied directly to Gateway's functionality.

Your Mission Starts Now!

It's time to test your engineering, teamwork, and problem-solving skills. Just like NASA's Artemis engineers, you'll need to design, build, and refine your robotic and drone systems to accomplish mission-critical tasks in this simulated lunar environment. The future of space exploration depends on innovation, precision, and collaboration—qualities that will define your team's success.

We challenge you to push the limits of technology and strategy as we take one small step for RDL Jr, and one giant leap for the future of space robotics.

Good luck, teams! The MOONBASE challenge begins now!

Sincerely,

Dennis M. Courtney

Dennis Courtney
Executive Producer RDL | RDL Jr.
CEO STREAMWORKS Education

Game Rules

Object of the Game

The object of the game is to successfully complete as many of these tasks as possible within a five-minute match, with the first sixty seconds being the autonomous period. RDL Jr. - MOONBASE is played on a **5 x 5 m** indoor perimeter matted field, surrounded and separated into equal halves by a combination of game elements designed for the current RDL challenge. The two field sides are mirror images of each other. One team is assigned a specific color alliance, either Red or Blue side. The goal: score higher than the opposing alliance. In the last one minute of the match, all game elements are considered neutral, meaning teams are allowed to cross the field into the opposing alliance side and score elements when brought into the alliance side scoring zones. Once a game element is in the scoring zone, the game element is considered rendered and cannot longer be used during match play.

Alliances & Matches

Alliance Selection and Point System:

- There will be two teams competing against each other: the Red Alliance and the Blue Alliance.
- Each alliance will consist of one team, four to six students at each drive station. The teams will be assigned random selection matches at the start of the competition.
- The competition will consist of several matches, with each alliance team competing against another alliance team.
- Once all teams have been assigned to alliances, the alliances will compete against each other in tournament style competition.
- Points will be awarded to each alliance based on their performance in each round.
- At the end of the tournament, all teams will be ranked based on total match play score. The top ranked team will be announced “RDL Jr. Alliance Champion”.

MOONBASE Mission Tasks

To support this mission, your team's robot and drone systems must work together to:

🚀 Deploy and Assemble Base Structures – Simulate the deployment of essential lunar habitats, solar power arrays, and communications structures.

🔬 Conduct Science and Resource Exploration – Use robotic and drone technologies to explore for critical lunar resources like ice deposits, which can be converted into oxygen and rocket fuel.

⚡ Maintain Lunar Operations – Perform tasks like solar panel inspection, communications relay setup, and deploy sensors and equipment in a harsh, low-gravity, and radiation-exposed environment.

🆘 Emergency Supply Delivery – Deliver medical kits and emergency water container pods from the Lunar Gateway to the MOONBASE, ensuring the safety of future astronauts.

🏗️ Lunar Gateway Docking & Payload Transfer – Your drones will interact with sensors (photoelectric or ultrasonic) to activate supply dispensers, demonstrating precision piloting for real-world lunar logistics.ion to the alliance competition, individual teams may also be eligible for awards based on their performance in specific tasks or objectives.

Mission Task #1: "Assemble MOONBASE Habitat Modules" - **600** Maximum Points
Assigned Mission Task - program or operate a robot that can assemble MOONBASE modules designed for science experiments, crew habitats, and mission operations.

Specific requirements for the mission include:

1. Biosphere Habitat Pod (Small) - The robot or drone must have the capability to position and place with precision, small habitat modules, qty four, placed at the alliance starting block squares and moved to the marked locations on the challenge field, connected via habitat tubes that are connected to the main Biosphere Habitat Pod that is permanently positioned on the field.

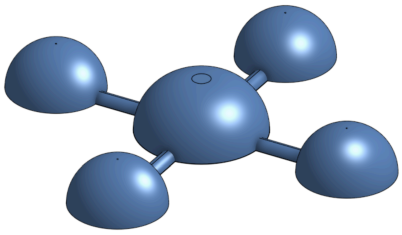
   

   Fig. 2 Biosphere Habitat

   WARNING! The biosphere pods contain magnets and will attach to the main structure when in close vicinity (< 25.4 mm).
   Autonomous Period + 100 Points (each)
   Teleop Period + 50 Points (each)
   No partial points awarded for partial placement.

2. Solar panels array - The robot or drone must have the capability to position and place, with precision, two solar panels, magnetically interconnected, pieces at the marked locations on the challenge field.
   Autonomous Period + 100 Points (each)
   Teleop Period + 50 Points (each)
   No partial points awarded for partial placement

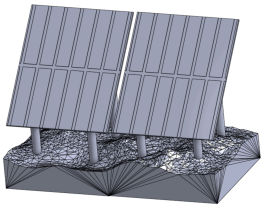
   

   Fig. 3 Solar Panel Array

3. Communications Satellite - The robot or drone must have the capability to position and place, with precision, the communications satellite cryptic microchip cartridge to the base of the satellite which has a magnetic connection point. The distance between the cartridge holder and the base of the satellite is 5 cm. A predetermined satellite dish angle of alignment will need to be calculated at the team drive station and adjusted angle cited prior to communications operations.
   Autonomous Period +100 Points
   Teleop Period + 50 Points
   No partial points awarded for partial placement

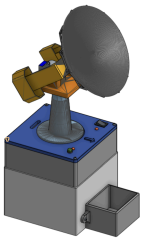
   

   Fig. 4 Communications Satellite

Mission Task #2: "Establish Electrical Power and Secure Communications Link" - **500** Maximum Points

Assigned Mission Task - program or operate a robot that can connect the power cable from the solar panel array to the MOONBASE Biosphere modules and connect the communications satellite link cable to the Biosphere connection point.

Specific requirements for the mission include:

1. Solar Panels Array - The robot or drone must have the capability to attach with precision, the electrical power connector located at the solar panel array to the main biosphere connection point at MOONBASE. These connections are magnetic and will automatically connect when brought to within close proximity of the connector point. The starting distance of the plug to the base of the solar panels is approximately 5 mm. A successful connection will complete the circuit and lighting within the biosphere structures will illuminate.
   Autonomous Period + 150 Points
   Teleop Period + 75 Points

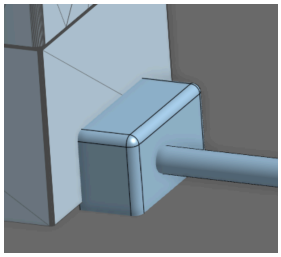


Fig. 5 Antenna Plug

2. Communications Satellite - The robot or drone must have the capability to attach with precision, the communications link cable connector located at the communications satellite base to the main biosphere communications link connection point at MOONBASE. These connections are magnetic and will automatically connect within close proximity. The starting distance of the plug to the base of the solar panels is approximately 5 mm. A successful connection will complete the circuit and lighting within the biosphere structures will illuminate.

   Autonomous Period + 150 Points
   Teleop Period + 75 Points

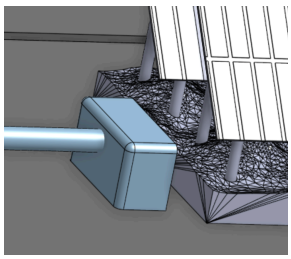


Fig. 6 Solar Plug

3. Communications Satellite Encryption - The robot or drone must have the capability to position, with precision, the encrypted communications microchip in the designated area (delivered within the boundary area outlined of the cartridge base) at the communications satellite base. The unencrypted microchips are available at the alliance driver station

Fig. 7 Microchip

prior to the start of all matches and must be encrypted prior to installation into satellite antenna designated areas.

For a successful microchip encryption process, review the “Gateway Lunar Orbiter” mission tasks.

Autonomous Period + 200 Points
Teleop Period + 100 Points
No partial points awarded for partial placement

Mission Task #3: "Aerial Survey and Exploration Site Marking" - **600** Points
Assigned Mission Task - program or operate a drone that can accurately fly an intended route.

Specific requirements for the mission include:

1. Aerial Survey - A team's drone will have an opportunity to perform an aerial survey of the challenge field, on a specific course by which specific waypoints and invisible vertical planes are intersected by the flight path. See depicted waypoint markers in the below figure, The path is a rectangular two row grid pattern that must pass specific waypoint checks within the alliance challenge field.
   Autonomous Period + 200 Points
   Teleop Period + 50 Points

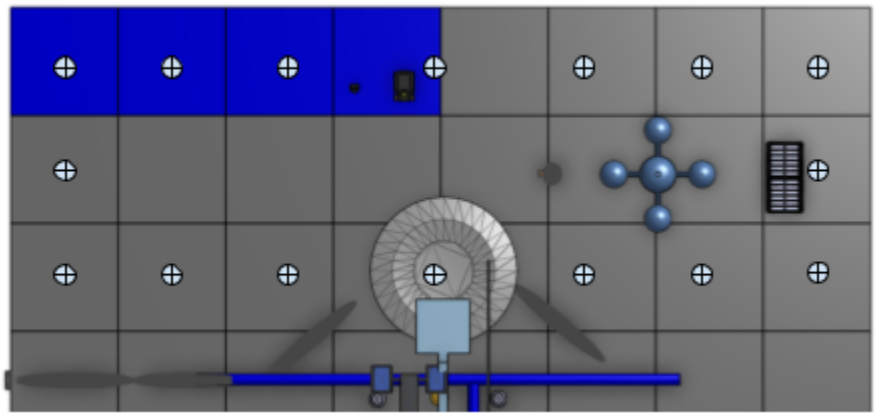


Fig. 8 Aerial Survey Waypoints

2. Site Marking - The robot or drone must have the capability to position and place, with precision, two markers at indiscriminate locations within alliance crater regions. Markers available at alliance stations and can be preloaded onto a robot or drone prior to match start.
   Autonomous Period + 200 Points (per marker)
   Teleop Period + 50 Points (per marker)

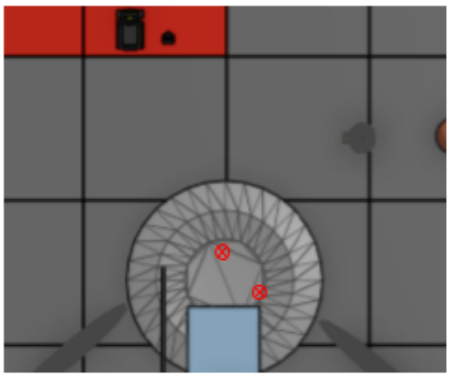


Fig. 9 Site Markers

Mission Task #4: "Sensor / Tool Deployment" - **800** Maximum Points
Assigned Mission Task - program or operate a robot or drone that can accurately deploy a sensor and a tool.

Specific requirements for the mission include:

1. Sensor Deployment - The robot or drone must have the capability to position and place, with precision, spectrometer sensors (5 x 3 mm) within alliance crater regions. Bonus points for sensor devices placed in direct contact and on site markers previously deployed in previous mission tasks.
   Autonomous Period + 100 Points (each sensor)
   Teleop Period + 50 Points (each sensor)

   Bonus Placement
   Autonomous Period + 100 Points (each sensor)
   Teleop Period + 50 Points (each sensor)

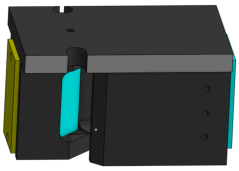


Fig. 10 Mass Spectrometer

2. Tool Deployment - The robot or drone must have the capability to position and place, with precision, a specific drilling tool (5 x 3 mm) within alliance crater regions. Bonus points for tool devices placed in contact and on site markers previously deployed in previous mission tasks.
   Autonomous Period + 100 Points (each tool)

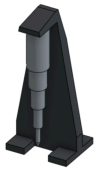


Fig. 11 Space Drill

Teleop Period + 50 Points (each tool)

Bonus Placement
Autonomous Period + 100 Points (each tool)
Teleop Period + 50 Points (each tool)

Mission Task #5: "Crater Mining and Moon Rock Alley Exploration" - **5300** Maximum Points
Assigned Mission Task - program or operate a robot or drone that can extract, collect, and return game elements to the alliance scoring zones. All gaming elements are affixed with velcro.

Specific requirements for the mission include:

1. Ice - The robot or drone must have the capability to extract, collect, and return ice game elements, qty 10 per alliance field (Diameter 71.89 mm) to the scoring zones of the assigned alliance station.

Fig. 12 Ice

Autonomous Period + 50 Points (each element)
Teleop Period + 10 Points (each element)

2. Titanium Moon Rocks - The robot or drone must have the capability to extract, collect, and return titanium moon rock game elements, qty 5 per alliance field (asymmetrical diameter approximately 7.6 cm (L) x 6.35 cm (H) x 5.8 cm (W) to the scoring zones of the assigned alliance station.

Fig. 13 Titanium Moon Rock

Autonomous Period +100 Points (each element)
Teleop Period + 50 Points (each element)

3. Helium - The robot or drone must have the capability to extract and collect helium game elements located on Moon Rock Alley and return to scoring areas. Helium game spheres are (diameter 22.1 mm) and designated with the element symbol **He**.

Fig. 14 Helium

Autonomous Period +100 Points (each element)

Teleop Period + 50 Points (each element)

4. Gold - The robot or drone must have the capability to extract and collect gold game elements, qty four elements (dims) located at the center of Moon Rock Alley and return to the scoring zones of the assigned alliance station. Gold specimens are 10.2 x 10.2 cm cubes and designated with the element symbol **Au**.
   Autonomous Period +1000 Points (each element)
   Teleop Period + 150 Points (each element)

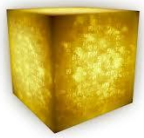
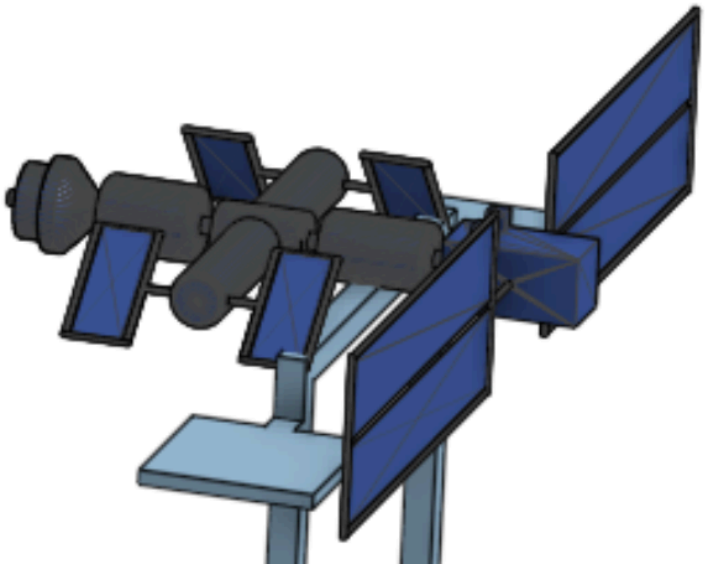


Fig. 15 Gold

Mission Task #6: "Lunar Gateway Space Station" (LGS) - 4500 Points
Assigned Mission Task - program or operate a robot or drone that can inspect, activate, collect, and return game elements to the alliance driver stations.



Fig, 16 Lunar Gateway Spacecraft

Specific requirements for the mission include:

1. LGS - The drone must perform a one time visual inspection and determine if any specific solar tiles are damaged on the spacecraft. The team captain or drone pilot should call out to the RDL Jr drive station official that the team is performing a solar panel inspection and then record the damaged areas onto a grid sheet provided at the drive station.

Autonomous Period + 200 Points
Teleop Period + 100 Points

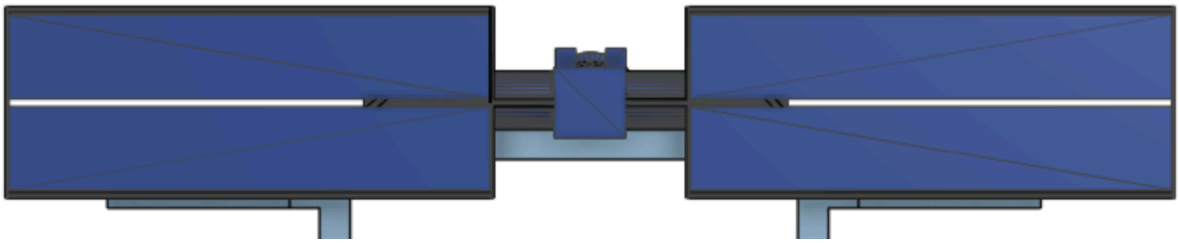


Fig. 17 LGS Solar Array

2. Docking - The drone must land successfully on the alliance docking station (30.5 x 30.5 cm) and pause for a minimum of 5 seconds. Each alliance drone may dock a maximum of 5 times per match..

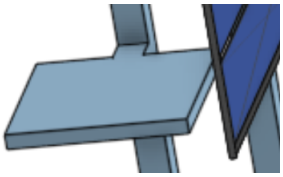


Fig. 18 LGS Docking Platform

Autonomous Period + 100 Points
Teleop Period + 50 Points

An additional +100 bonus points for a successful drone stunt maneuver upon departure from the LGS docking platform.

3. Encryption - If a drone is equipped with a microchip to be installed in the communications satellite, the encryption process will start automatically upon drone touchdown on the LGS landing dock. A successful encryption will result in a green LED illumination on the block near the back of the landing platform. Encryption takes approximately a five seconds to complete.

Fig. 19 Microchip

Autonomous Period + 300 Points
Teleop Period + 50 Points

4. Emergency Supply Pods - The drone must activate the emergency supply pods for H2O and Medical Supplies by flying in close proximity to the sensor located at a

Fig. 20 Emergency Supplies

designated location on the LGS. Drones are allowed to activate the release of the pods, qty 10 per team (diameter 40 mm, weight 2.7 grams) from the spacecraft which will free fall to the surface of the challenge field. Pods can then be collected or directed (via prop wash) to the scoring zones located at the MOONBASE perimeter base area color coded to the assigned alliance and driver stations.

Autonomous Period + 300 Points (each)
Teleop Period + 100 Points (each)

Mission Task #7: "STEM Questions" - 1000 Points
Assigned Mission Task - Examine STEM questions from the display monitors located at the alliance mission stations.

Specific requirements for the mission include:

1. STEM Questions - Each alliance team is permitted to inspect and attempt solving STEM Questions, maximum of 5 questions per match.
   Autonomous Period + 200 Points (each element)
   Teleop Period + 100 Points (each element)

Autonomous Period

At the beginning of a five minute match, the first 60 seconds is considered the autonomous period. Human control of the robot or drone is not allowed. Teams are awarded points for autonomous movement of the robot or drone as depicted in the scoring table below. **NOTE: Drones and robots will not be reset during this time in the event of task failure.**

Teleop Period

Upon completion of the 60-second autonomous period, the remaining four minutes are considered a teleop (human control) period. Autonomous functions are not restricted during the teleop period; however, human operators will maintain hands-on control of the robot or drone during the four minute period.

Team Organization

Teams may consist of an unlimited number of members; however, there is a limit of six players allowed in the driver's station (per team). There are designated team areas in the viewing stands as well as a designated pit area for all teams.

Drive Stations

For each alliance side, there is a designated area for interaction between human players and robots called the drive station. Each team will need to assign a drive station captain who is responsible for coordinating team strategies and communication with field officials. Robots and drones deploy from or bring collected elements to the drive station area, where the field official will acknowledge that game pieces have entered into scoring zones. No team members are never allowed to reach out into the field. (Reaching in or onto the field will constitute a yellow card. Repeated violations will constitute a red card.)

League Guidelines

League Overview

The Robot Drone League Jr. season runs annually from early fall through spring. RDL Jr. Teams should benefit from the guidance of teachers or mentors, with the constraint that only the students are the only ones allowed to build the robot and drone and compete.

RDL Jr. Team Showcase

Teams have the opportunity to submit a five (5) to seven (7) minute video. Advancing teams to the 2025/2026 RDL Jr. Nationals must submit the video no later than the published date, March 1st, 2026 in MOV. orMP4 format with applicable permissions afforded to RDL Jr. for viewing, distribution, and republication..

In this video, teams will be expected to showcase their robot, drone, and supplemental devices (such as grippers, hooks, etc.). Apart from material aspects, teams will also be expected to discuss different things such as team funding, fundraising, community outreach, team & project management, and anything else teams feel necessary to describe the scope of accomplishments of the team for the competition season.

In addition, teams are allowed to include technical documents (less than 10 pages, i.e. engineering notebook, reports, posters), and published materials to aid the RDL Jr. Team Showcase in support of the team's presentation to the judging panel.

Teams are encouraged to take a more in-depth research approach towards the RDL Jr. theme as this challenge relates directly to their communities, states, etc. i.e. the mining industry, and address these issues and potential remedies / solutions in the team showcase video production. In addition, your team is encouraged to share if AI was utilized to aid in the RDL Jr. challenge project and how this technology has added to the learning experience.

Engineering Notebook (Required)

An engineer's notebook is a book in which an engineer will formally document, in chronological order, all of the teams work that is associated with a specific design project. For RDL Jr., the engineering notebook serves a unique purpose in recording the teams' actions and discoveries throughout the RDL Jr. season. A good engineering notebook is strongly recommended for teams hoping to compete in any awards category. The engineering notebook should have your team number and school name on the front cover. Engineering notebooks may contain other pertinent information such as community outreach, budgets, sponsorships, mentor notes, goals, and lessons learned. Each team session should be recorded in writing with accurate dates and times of meetings. Team members contributing engineering notebook entries must initial all entries responsible for inclusion. Illustrations and CAD diagrams are highly suggested. Only one notebook per team shall be submitted. Teams will leave notebooks with the judges' advisor and must retrieve them prior to the end of the competition.

Team Member Safety Protocol

The primary concern during any RDL Jr. event is safety. To ensure the safety of all participants and observers, safety restrictions within the driver station, pits, and venue must be followed at all times. The number of team members allowed in the driver station during a match is limited to no more than six student participants.

Team members are not allowed to reach into the field perimeter for any reason, including the lab section access points.

Mentors are never allowed to coach at the driver's stations during match play. All players in the driver's station must wear closed-toe shoes, as well as safety glasses. Long hair must be pulled back and secured. No loose clothing or dangling jewelry is permitted.

SAFETY GLASSES ARE MANDATORY

Starting Position

Robots and drones need to be placed in the starting position prior to beginning the match. The starting position is marked by a 61 x 61 cm square, colored to correspond with the alliance. There are starting positions for both drone and robot. Robots and drones may start with a scoring element or sensor preloaded at the base or within the rig. Alignment tools and devices are allowed onto the playing field as long as the tools pass safety inspection and do not interfere with the ability of the opposing alliance to retrieve game elements and score points.

Safety Check

The game has numerous scoring strategies which impact the design and construction of the team robots and the programming of the drones. Following the Four Laws of Robotics, safety is the primary concern for humans, robots, and drones related to inspection. Each robot and drone are required to successfully pass a safety check before competing in the tournament. To pass a safety check, robots and drones need to successfully meet the specifications defined below. If a robot or drone is not deemed safe, it is not allowed to compete. After a robot and drone have passed safety checks, teams will be given a safety sticker that must be present throughout the competition. **Please note that when practicing for or competing in an event, safety should always be the priority. Unsafe operations of both robots and drones can result in serious injuries in the occurrence of misuse or malfunctions.**

Robot Specifications

Robots must undergo and pass all of the following criteria in order to pass safety inspection:

- No more than 26 cm (L), 26 cm (W), and 26 cm (H) (in starting configuration)
- Wires should be attached to the frame and/or organized in a safe and secured configuration
- Robots must have **no exposed wires**
- Robots may not use batteries greater than 12V
- All robots **must have an ON/OFF control switch, visibly labeled**
- Robots must not have sharp edges that would allow the robot to intentionally disregard any of the Four Laws of Robotics

- Hydraulic systems **are not allowed**
- Pneumatic systems, while legal, must have a pressure relief valve and be **limited to 50 PSI**

Drone Specifications

Drones must undergo and pass all of the following criteria in order to pass safety inspection:

- The diagonal distance from tip of propeller to tip of propeller (Extended to fullest) must not exceed 175 mm.
- Drone propellers must be shrouded with protective devices

Teams can use any means of programming the drone.

When not in use or during transportation, it is advised to remove propellers to ensure safety.

Team Members

During a match, a team cannot use other participants outside of the driver station to guide robots or drones. If the team is viewed as using external participants to gain an advantage, a yellow card can be issued. If the issue persists, the team can be issued a red card. Team members are not allowed on the field during a match and must remain in the driver station or pit at all times, with the exception of the lab technician, who is in the lab station. **Under no circumstances shall a team member (including the lab technician) reach in with any body part onto the field.** If the robot or drone is not working, an RDL Jr. official will place the robot or drone into the driver station area for the team to work on. Team members who violate the field access rules are awarded a penalty card at the discretion of the RDL Jr. official.

Team Pits

Teams are assigned a designated space during the competition which is referred to as the “Pit Area”. Robot and drone testing operations are not allowed in these areas. A designated area for testing and practice will be made available. For specifics on safe testing practices, consult with the regional event coordinator.

Match Scoring

Each team is recommended to designate a scoring captain. The scoring captain is responsible for keeping track of the team’s points during the match. If a scoring captain sees a possible error after an RDL Jr. official has calculated the final scores for both teams, the scoring captain may challenge the scoring with two different RDL Jr. officials.

The two RDL Jr. officials will reconsider the team's score. Scoring captains will need to present evidence for any scores to be reconsidered, including, but not limited to, video evidence. Any adults affiliated with the team, to include the lead coach or mentor, must not interfere and / or be involved with the scoring challenge process.

Match Setup & Field Reset

Before each match, teams have three minutes to set up the robot and drone. Teams also have a three minute breakdown period after each match. After each match, RDL Jr. officials will reset the field. During this time, teams are required to remove their robots and drones from the field.

Penalties

Definitions

Yellow cards serve as warnings to teams. Red cards result in a fifty (50) point deduction from a team's score **for each occurrence**. Three consecutive red cards constitute the team to whom the red card was issued to forfeit the following match, unless it is the final match for that team wherein that match will be forfeited in its entirety. An individual team member may receive a yellow / red card for intentional and / or repeated safety violations or poor sportsmanship.

1. Following the intent of the Four Laws of Robotics, a robot or a drone may not purposely harm another robot, unless that somehow violates the First Law related to the safety of a human. The field is large, and it is expected that robots from each team might come in proximity to each other. Robots should not intentionally contact another robot to play defense or prevent the other robot from accomplishing a task.
2. Purposely blocking a robot or a drone with another robot to prevent scoring or movement of the robot results in a yellow card.
3. Drones that intentionally crash into a robot as a way to prevent scoring result in a red card for the offending drone pilot. Drones that purposely crash into an opposing robot are not eligible to be rescued during the match. (RDL Jr. Officials reserve the right to constitute what is intentional vs. accidental crashing.)
4. If a drone collision occurs, pilots are awarded a yellow card. If, in the opinion of a referee, a drone intentionally crashed into another drone or did not show clear intent to avoid a collision, a red card can be issued for the offending drone's pilot.
5. Intentional electronic interference with a team's robot or drone control systems is cause for immediate event disqualification and permanent ban from future RDL events. Electronic interference is caused by operating robots and drones in close proximity to the field of play. Robots and drones powering up are only allowed in designated practice areas or under the supervision of a RDL Jr. official.

Yellow Card

A yellow card serves as a warning for robot or drone behavior that is not in the spirit of the Robot Drone League. Any yellow card that is issued can be reviewed by league officials at the end of the match to determine if the actions of the robot under the control of the driver were intentional to gain an advantage and disregard rules. If the league officials determine that the rule violation was intentional, it can become a red card.

Red Card

A red card issued for poor robot or drone behavior will result in the designated driver's absence in the next match, as well as a fifty (50) point deduction from the offending team's final score. The driver is allowed in the driver's station during the next match. A drone that is awarded a red card requires that the pilot of the drone sit out the following match.

Excessive Mentorship

Mentoring is essential in everything, especially robotics. That said, STREAMWORKS values the sound learning principles of project-based learning and self-directed discovery as it pertains to STEM learning and career interest. It is very simple, teach your students the fundamentals and then get out of the way!

During an RDL Jr. event, if mentors, parents, or any adults are seen by an RDL Jr. Official or Judge actively working on a team's robot, this will result in a verbal warning from the competition director, possible team disqualification from competition matches and forfeit of any awards related to the competition matches or design of the robots. Additionally, if judges/officials have a suspicion of excessive mentorship which has affected the outcome of the design of the robot, the judges/officials have the right to conduct an investigation into a more thorough understanding of the team's knowledge of their own robot.

The 2025 RDL Jr MOONBASE challenge game is designed to be a challenging and fun game. In the interest of fairness and clarity, rules may need clarification or additional rules added during the season.

Awards

Professors Champions Award – Awarded to the top team that encompasses the overall best in competition, both on and off the challenge field. Awarded to the team demonstrating the best of community outreach that helps to promote STEM learning in an individual community. An engineering notebook and team Showcase video are required for award consideration.

The following factors are taken into consideration for this prestigious award:

Challenge field scores

Team Showcase presentation

Community Outreach

Tournament Professionalism

Collaborative Spirit

Top Score Award – Awarded to the 1st place team based solely on scores finalized at the end of the challenge field play.

Engineering Award – Awarded to the team that best demonstrates innovation in design and provides best evidence of documented engineering practices to a panel of SME professionals. An engineering notebook and team Showcase video is required for award consideration.

Judges Award* – Awarded to the team that best demonstrates team grit and tenacity no matter the scoreboard. *Note* (This award is optional and awarded at the discretion of the Head Judge).*

Top Dog Award – Awarded to the team demonstrating the highest competition autonomous scores.

Top Rookie Award – Awarded to the best of the best Rookie team competing in their first RDL season. An engineering notebook and team Showcase video is required for award consideration.

Scoring rubrics can be found online at www.robotdroneleague.com

Index

Sample STEM Questions for RDL Jr.

1. What does an astronaut do?
A. Flies airplanes on Earth
B. Explores space and works on spacecraft
C. Builds houses
D. Teaches music

Answer: B. Explores space and works on spacecraft

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2. Which planet is known as the "Red Planet"?
A. Mars
B. Saturn
C. Mercury
D. Neptune

Answer: A. Mars

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3. What do astronauts wear to stay safe in space?
A. Pajamas
B. Raincoats
C. Space suits
D. Lab coats

Answer: C. Space suits

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4. Which tool helps scientists see stars and planets far away?
A. Microscope
B. Telescope
C. Periscope
D. Sunglasses

Answer: B. Telescope

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5. What do we call the big group of stars, planets, and space dust we live in?
A. Solar System
B. Jungle

C. Ocean
D. Continent

Answer: A. Solar System

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6. Which planet has rings around it?
A. Earth
B. Saturn
C. Mars
D. Venus

Answer: B. Saturn

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7. What does the Moon do?
A. Stays still and never moves
B. Spins and orbits Earth
C. Floats on the ocean
D. Lights up the Sun

Answer: B. Spins and orbits Earth

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8. What is a rocket used for?
A. Driving on roads
B. Taking people and tools into space
C. Flying like a bird
D. Sailing in the ocean

Answer: B. Taking people and tools into space

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9. Who was the first person to walk on the Moon?
A. Albert Einstein
B. Neil Armstrong
C. Buzz Lightyear
D. Sally Ride

Answer: B. Neil Armstrong

Robot Drone League Jr. Standards Alignment

For a complete listing of state curriculum standards and alignment with the Robot Drone League annual STEM challenge, please visit RDL Curriculum Standards.

Don't see your state curriculum alignment standards?
Email us at dcourtney@streamworkseducation.org for additional information.