



DNA DASH GAME MANUAL

OVERVIEW

A burst of radiation has damaged the cell's DNA! It's up to you, the nanobots, to repair the DNA and make proteins!

Build proteins

- ❖ Robots collect AMINOS and load them into the RIBOSOMES, scoring them through either the LARGE SUBUNIT or SMALL SUBUNIT to prepare to turn the AMINOS into protein.

Sequence NUCLEOTIDE on DNA HELIX

- ❖ Robots gather NUCLEOTIDES and place them onto the DNA HELIX to repair it.

Prepare for PROTEIN TRANSPORT

- ❖ Robots will attach to the RIBOSOME at the end of the game and climb to prepare for PROTEIN TRANSPORT.

GAME ELEMENTS & GAME PIECES

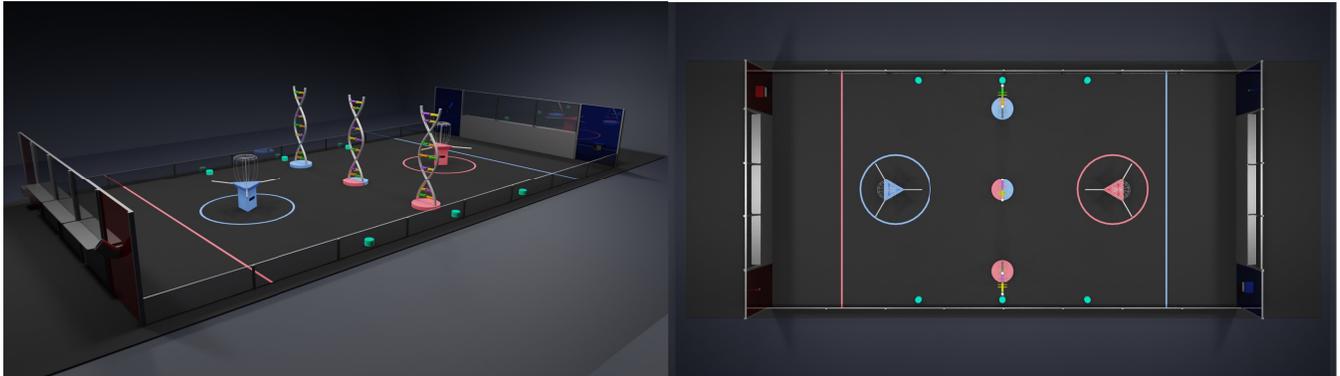
<p style="text-align: center;"><u>RIBOSOME</u></p>	<p style="text-align: center;"><u>AMINOS</u></p>
<p>The RIBOSOMES are triangular towers with a chain net protruding from the top for scoring AMINOS. The low goal (SMALL SUBUNIT) has a slot on each face. The high goal (LARGE SUBUNIT) consists of chains, which AMINOS are shot at. From each face protrudes a bar (BINDING SITE), for climbing during the endgame.</p>	<p>AMINOS are flat discs with an outer diameter of 11in, and a height of 1.45in. They are made of plastic and are scored into the RIBOSOMES. They can be found in stacks or added through the AMINO LOADING BAY, which is a chute in the ALLIANCE WALL.</p>
<p style="text-align: center;"><u>DNA HELIX</u></p>	<p style="text-align: center;"><u>NUCLEOTIDE</u></p>
<p>The DNA HELICES are tall, flattened helices with racks spanning the middle. Each HELIX is 7 racks tall with 2 adjacent on each level, for 14 racks total. From each rack protrudes 2 hooks for 28 total hooks. Each rack will be 1 of 4 colors. The bottom</p>	<p>NUCLEOTIDES are rounded hoops with an outer diameter of 5in, an inner diameter of 3in, and a height of 1in. They are made of hollow plastic and are hung onto the DNA HELIX. They will be 1 of 4 colors: orange, green, yellow and purple. They are</p>



2 racks of each HELIX will remain orange and green throughout each round, and the rest are randomly colored at the start of each match. Adjacent racks pair in couplings of orange with green, and purple with yellow.

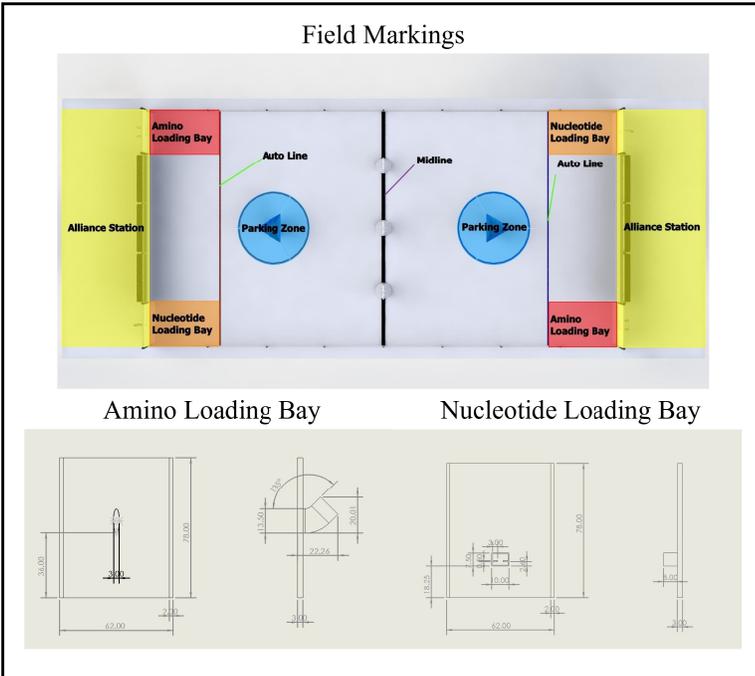
hung onto DNA racks of the corresponding color. They can be picked up at the NUCLEOTIDE LOADING BAY, a slot in the ALLIANCE WALL.

FIELD



The field dimensions for DNA DASH is 27ft by 54ft 4in with a guard rail to keep robots in the field. The field contains 3 HELICES vertically down the center, one for each team and the one in the middle shared. The field also features 2 RIBOSOMES, one on the opposite alliances' side. The field has two NUCLEOTIDE PICKUP ZONES and two AMINO PICKUP ZONES, one of each attached to the alliance station. There are two driver stations on each alliances' sides that are dedicated to their respective teams.

ZONES AND MARKINGS



- ALLIANCE STATION: a 30ft wide by 10ft deep infinitely tall formed by the ALLIANCE WALL and edge of the carpet
- AUTO LINE: a line that spans the width of the FIELD 8ft from the ALLIANCE WALL
- CENTER LINE: an unmarked reference line that bisects the length of the FIELD
- PARKING ZONE: a 96in diameter circle around the RIBOSOME
- NUCLEOTIDE LOADING BAY: A slot through which human players dispense NUCLEOTIDES
- AMINO LOADING BAY: A chute through which human players dispense AMINOS



MATCH PLAY

<u>MATCH SETUP</u>		<u>PRELOADING</u>
AMINOS	<ul style="list-style-type: none"> • 5 AMINOS available to each TEAM to preload in their robots • 3 stacks of 5 AMINOS along each side of the field • 70 located in each ALLIANCE STATION 	When a DRIVE TEAM loads their robot onto the field for a MATCH they may elect to: <ul style="list-style-type: none"> • Preload 5 AMINOS such that they are fully and only supported by the robot • Preload 3 NUCLEOTIDES such that they are fully and only supported by the robot
NUCLEOTIDES	<ul style="list-style-type: none"> • 3 NUCLEOTIDES are available to each team to preload in their robots • 60 located in each ALLIANCE STATION 	

Periods & Expected Robot Actions

Period	Duration	Description
AUTO	0min 15s	Teams are expected to program their robot actions in advance to operate the robot without any driveteam input Teams can score by: <ul style="list-style-type: none"> • Scoring AMINOS in the SMALL SUBUNIT or LARGE SUBUNIT of their RIBOSOME • Hanging NUCLEOTIDES on either their or the shared DNA HELIX on racks that match color with the NUCLEOTIDE in a robot's possession
TELEOP	1min 45s	DRIVERS may operate robots to sequence NUCLEOTIDES on specified colored racks and deliver AMINOS.
ENDGAME	0min 30s	The LOADING STATION shuts down and the human player may throw AMINOS to the robot or RIBOSOME to complete transport, as well as NUCLEOTIDES. Robots may climb on the BINDING SITES

Scoring And Ranking Points

Action	Points		
	TELEOP	AUTO	Ranking
Cross the AUTO LINE during AUTO	-	15	-
NUCLEOTIDE is hung on the HELIX that matches the illuminated rack	5	10	-
NUCLEOTIDE is hung on the Helix that in the incorrect color	2	4	-
Scoring in SMALL SUBUNIT	3	6	-
Scoring in LARGE SUBUNIT	5	10	-
One robot climbs	30	-	-
Park in the PARKING ZONE in endgame	10	-	-
Complete PROTEIN TRANSPORT	-	-	1



Fill out the shared middle DNA HELIX correctly	-	-	1
Winning	-	-	2
Tie	-	-	1

PROTEIN TRANSPORT is completed once 2 robots climb and 1 parks in the PARKING ZONE, or all 3 robots of the ALLIANCE climbs. Scoring in the opponent's DNA HELIX will award the opposing alliance points.

GAME RULES

<u>Before the Match</u>	<u>Robot to Robot Interaction</u>
<ul style="list-style-type: none"> ❖ Robot must have passed general robot INSPECTION ❖ Don't overextend yourself: A robot may not exceed the volume for which it passed inspection <ul style="list-style-type: none"> ➤ Robots may only extend beyond their frame perimeter once the match has started. The extension limit is 30in 	<ul style="list-style-type: none"> ❖ Opponent touching their CLIMBING BINDING SITE: don't touch them. Robots may not contact an opposing robot, regardless of who initiates the contact, if the opposing robot is in contact with one of its own ALLIANCE'S BINDING SITE ❖ Don't pin robots for more than 5-seconds ❖ Do not extend your robot into another robot

Field Interaction

- ❖ Do not grab onto the lip of the LARGE SUBUNIT, the DNA HELICES, or a claimed BINDING SITE (a BINDING SITE that another robot is in contact with).
- ❖ No intentional detachment of any of your robot's parts
- ❖ Don't go into your opponent's PARKING ZONE during Endgame
- ❖ One robot per BINDING SITE. No more than 1 robot may be fully supported by an extruding BINDING SITE.
 - Robots may only climb on the BINDING SITE; robots may not climb on top of each other
 - A robot may only signal that they are ready for PROTEIN TRANSPORT by climbing a BINDING SITE.
- ❖ During AUTO, a robot cannot cross MIDLINE

Game Piece Interaction

- ❖ Don't misuse the game pieces. Robots are not allowed to purposely use game pieces', (AMINOS and/or NUCLEOTIDES) in any manner other than their intended use as items to be scored (hung on a BINDING SITE, thrown to harm other robots, etc.)
- ❖ Game pieces, once on field, must remain within field confines. Robots cannot purposefully discharge game piece from the field
- ❖ A robot may not launch a NUCLEOTIDE
 - Score game pieces in their respective goals. Robots are not allowed to intentionally put NUCLEOTIDES in a RIBOSOME; robots are not allowed to intentionally put AMINOS on a DNA HELIX.
- ❖ Robots must be in the PARKING ZONE if the wish to score in the SMALL SUBUNIT of the RIBOSOME
Robots may only possess one type of game piece at a time. A robot may possess a maximum of either 3 NUCLEOTIDES or 5 AMINOS at any given time. (Ex. Robots possessing 2 AMINOS cannot possess NUCLEOTIDE)
- ❖ Robots may not affect the movement of game pieces outside its volume with anything not connected to the robot (ex: air or other game pieces)
- ❖ Human players may not purposefully throw game pieces in an attempt to disrupt or harm robots and the field.