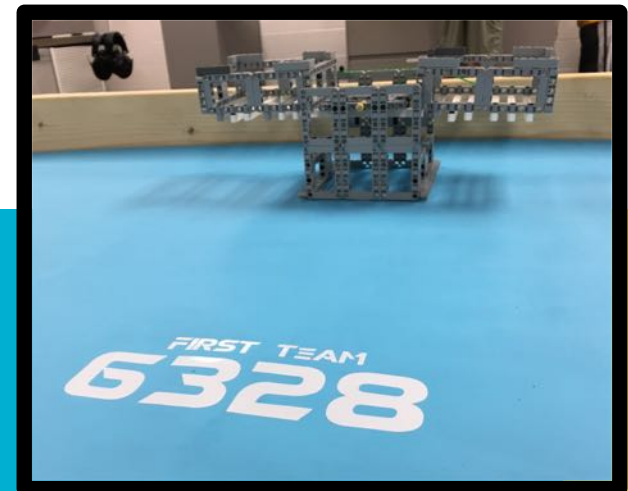


FIRST LEGO LEAGUE

PowerUp Summer Game

2018

Presented by FRC 6328



FLL POWER UP OVERVIEW

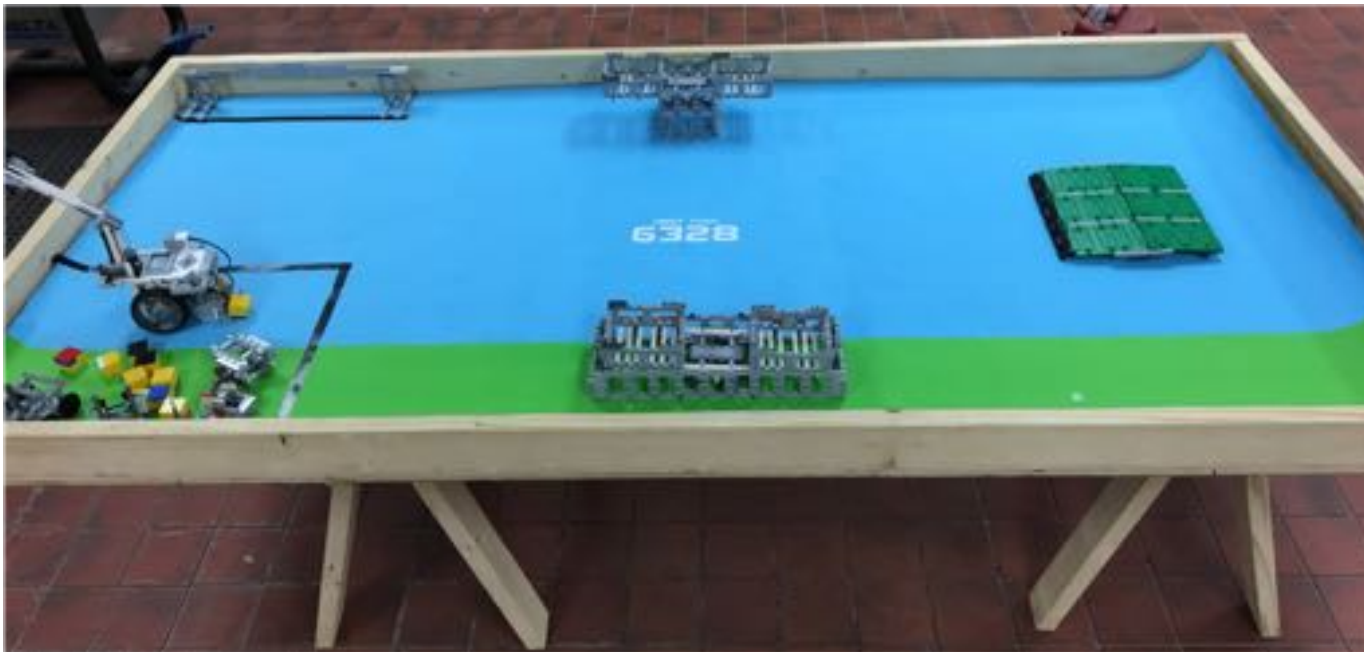
The purpose of the FLL PowerUP game is to provide an engaging summer program for FLL students that will help prepare them for the upcoming FLL competition season. It is also a great way to get expose FLL students to the FRC program so they are excited to make the jump upon graduation from FLL.

The game is intended to be simple enough that robots can be built and programmed to play it in a 1 week-long session, or with once a week meetings for the duration of the summer.

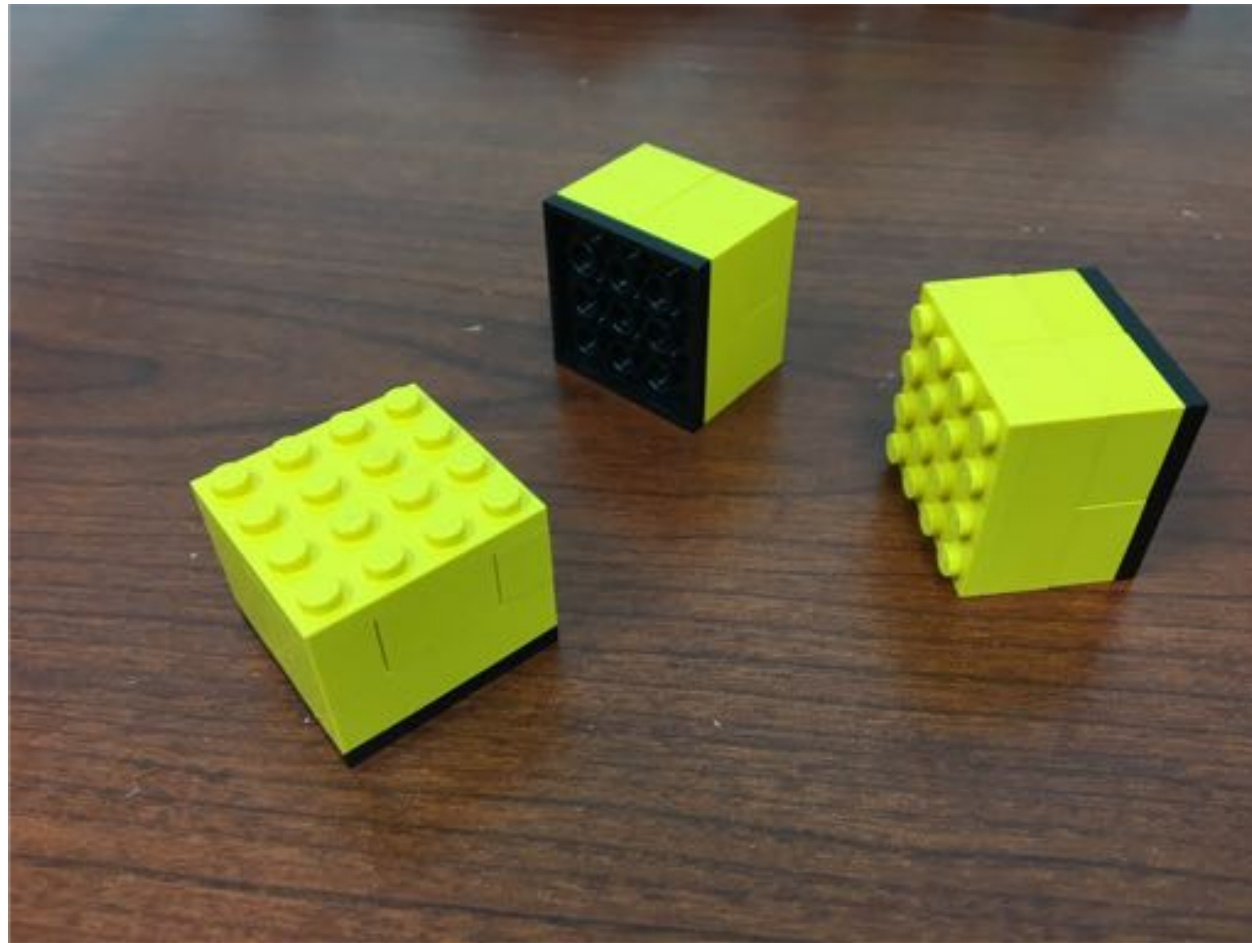
GAME BOARD

The FLL PowerUp field can be created on the back-side on an old FLL game mat. Instructions for how to build the mission models can be found here:

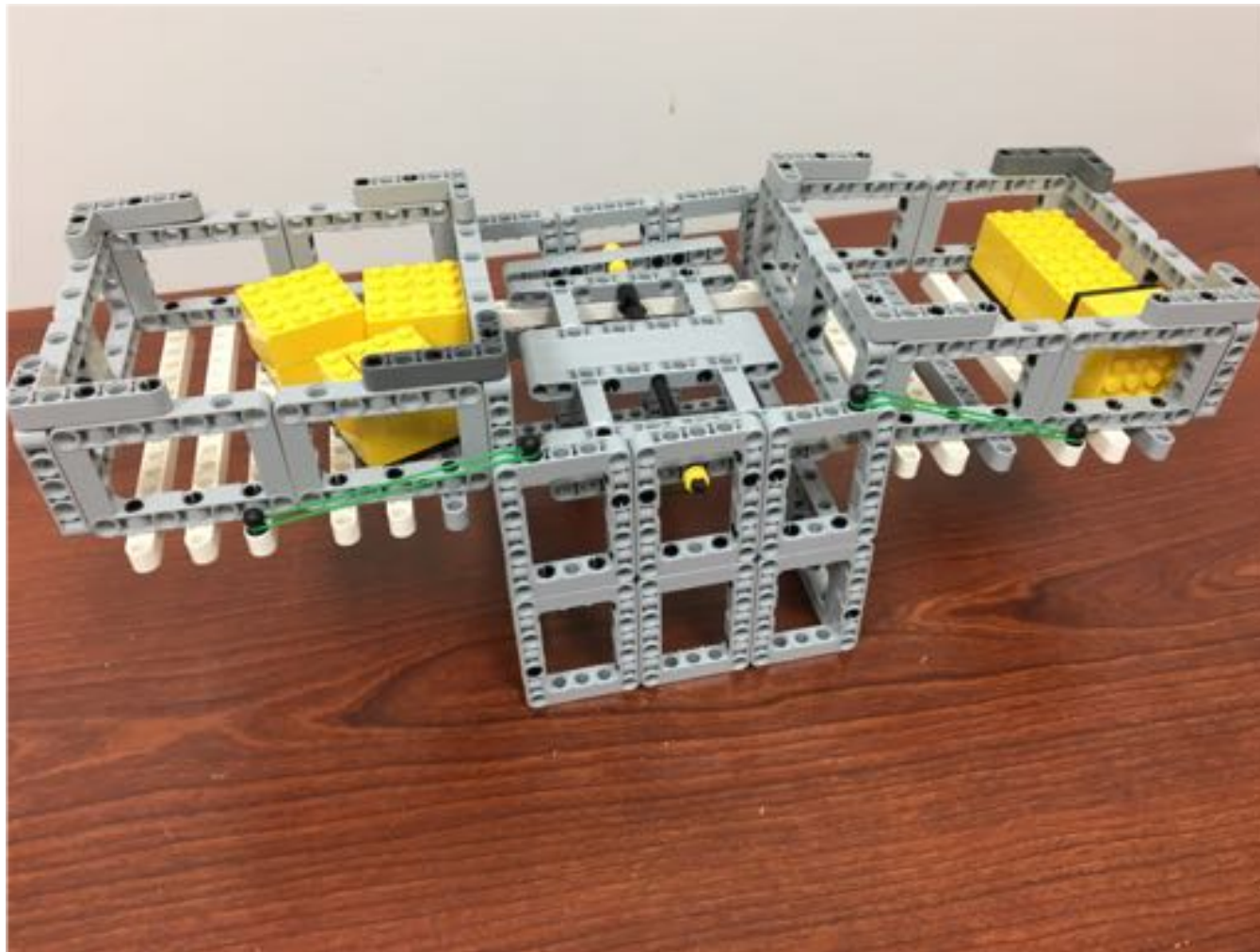
[FLL PowerUp Mission Model Instructions](#)



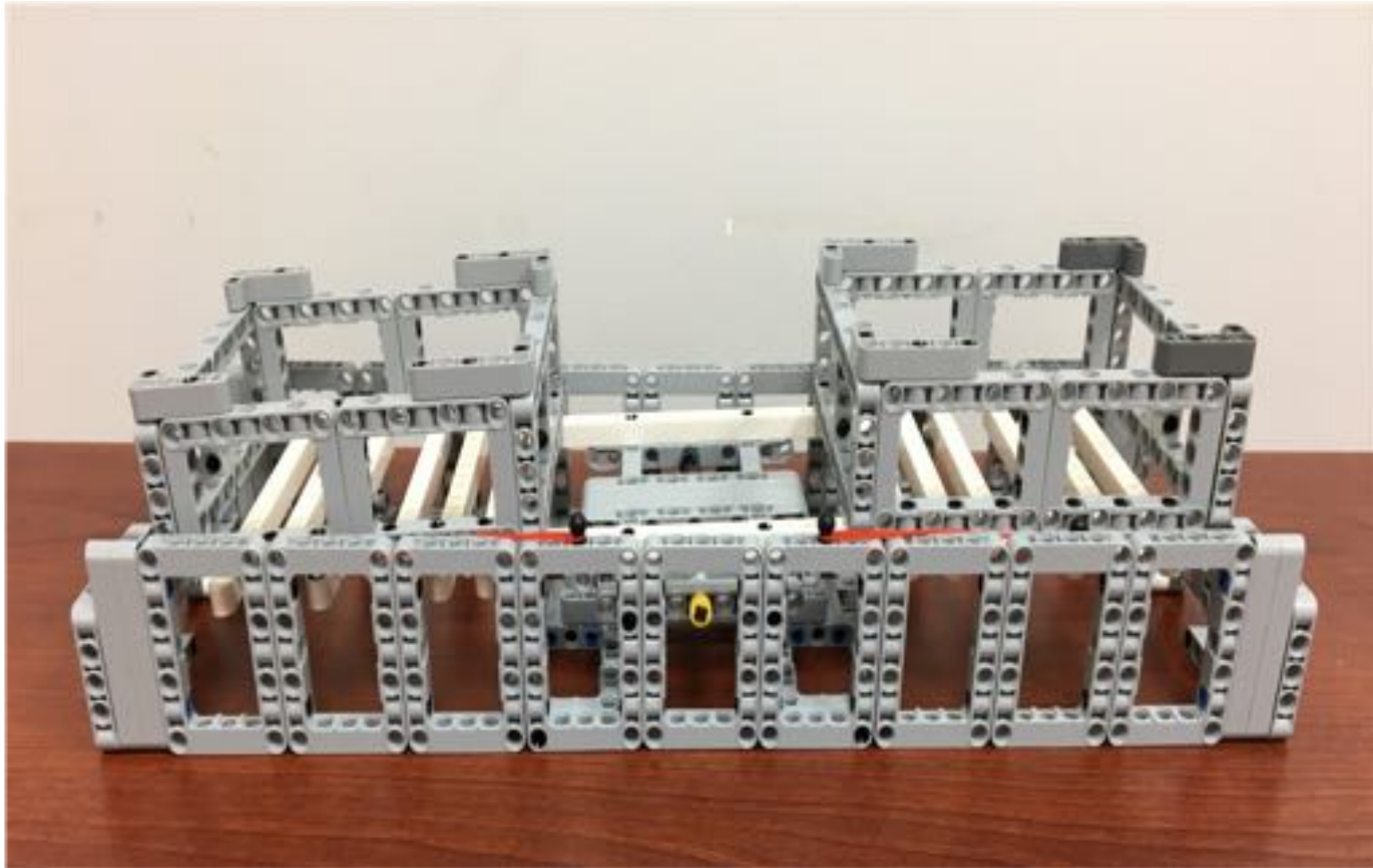
MISSION MODEL: POWER PRISMS



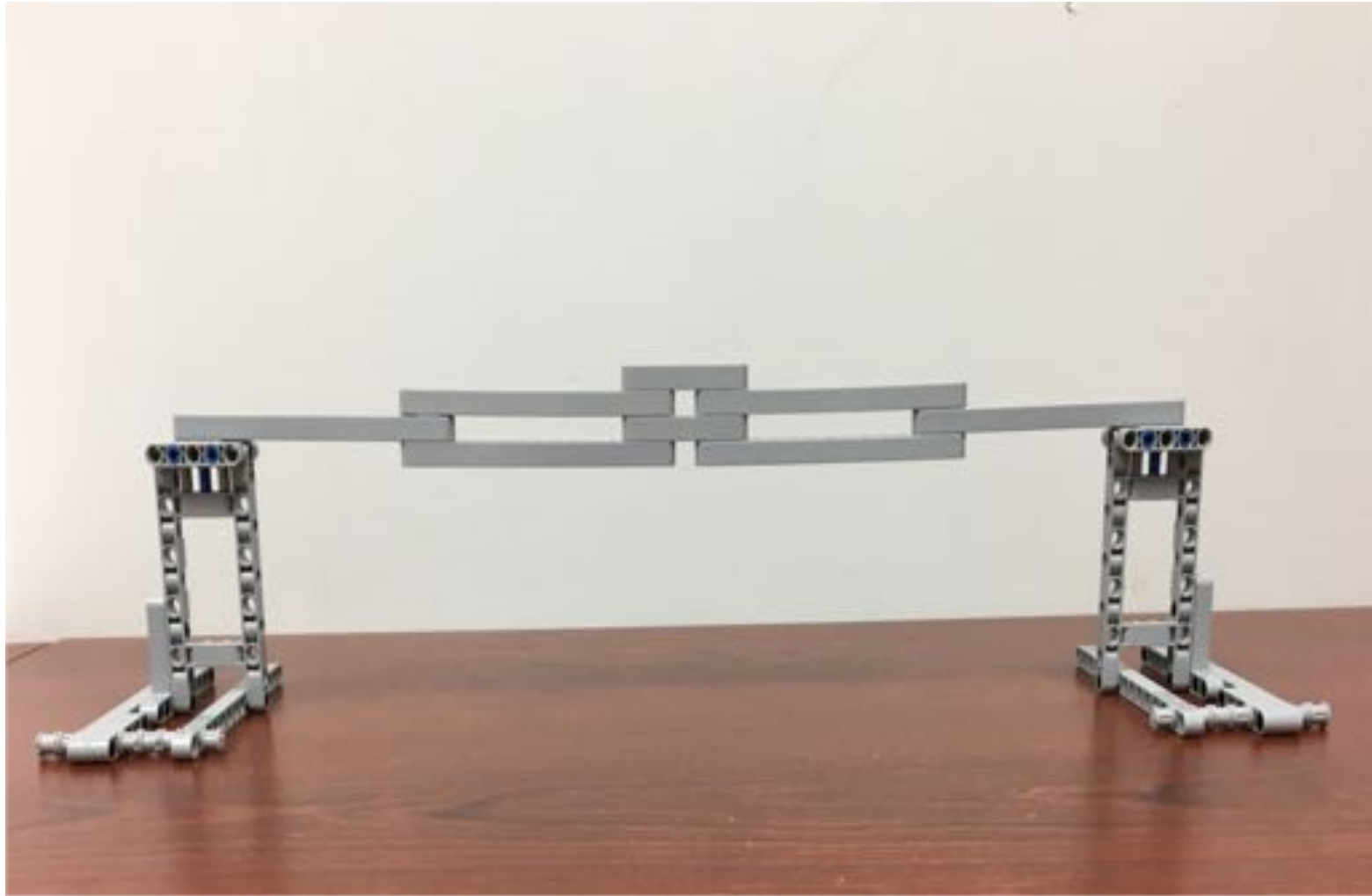
MISSION MODEL: SCALE



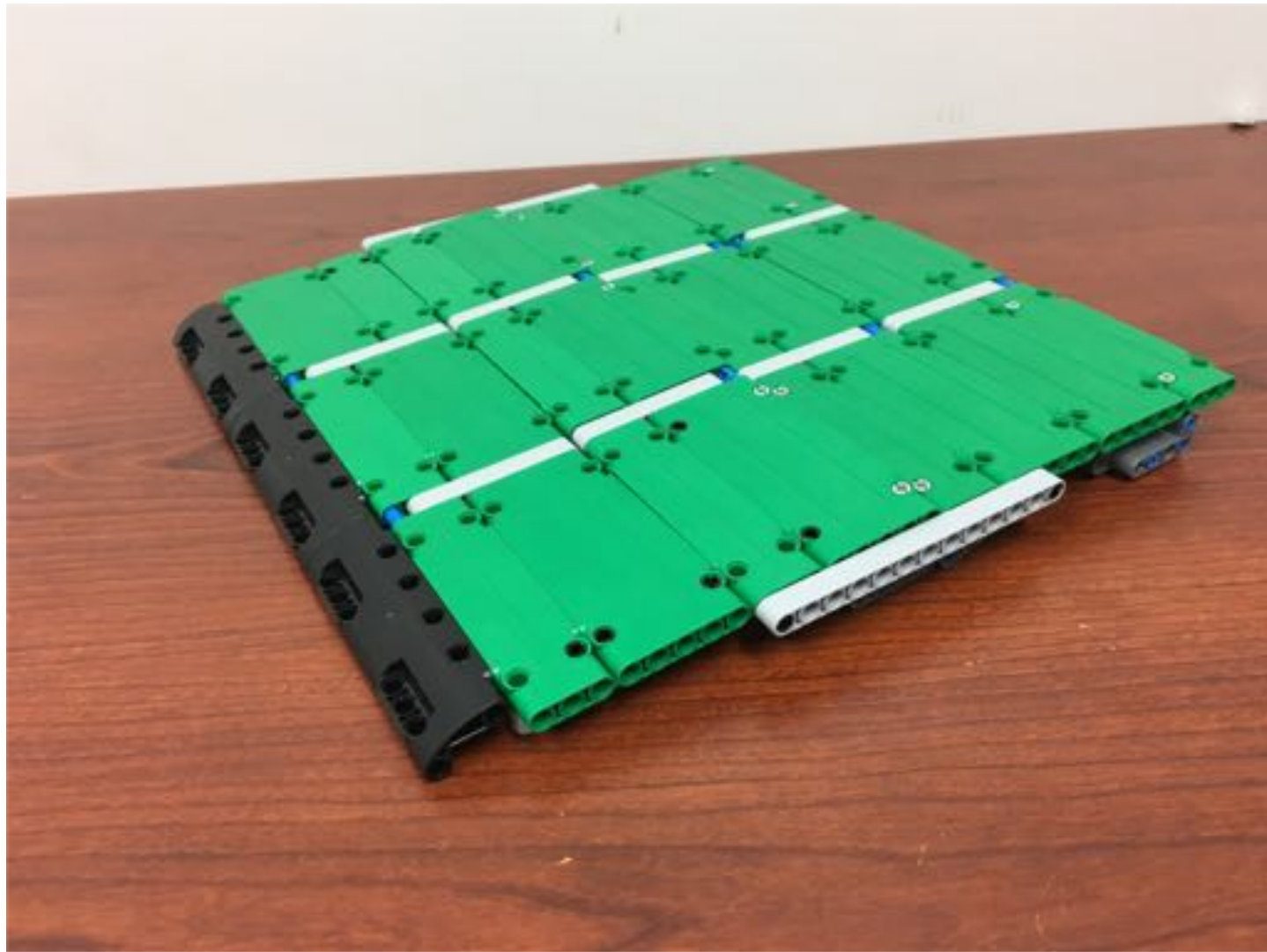
MISSION MODEL: SWITCH



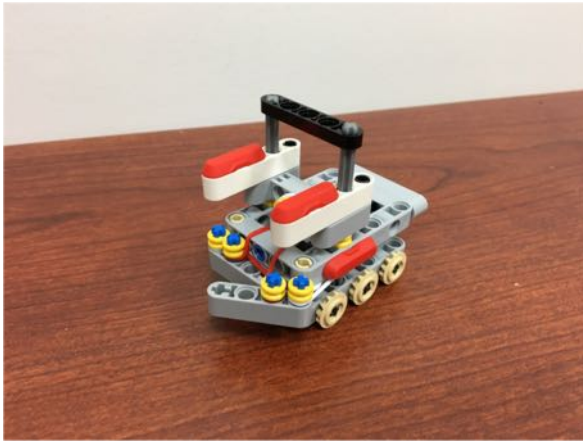
MISSION MODEL: EXCHANGE



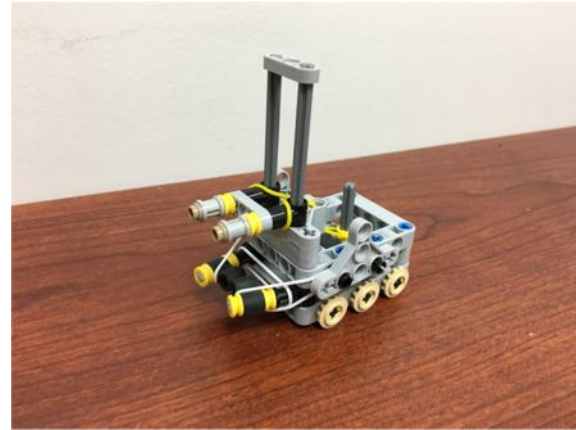
MISSION MODEL: RAMP



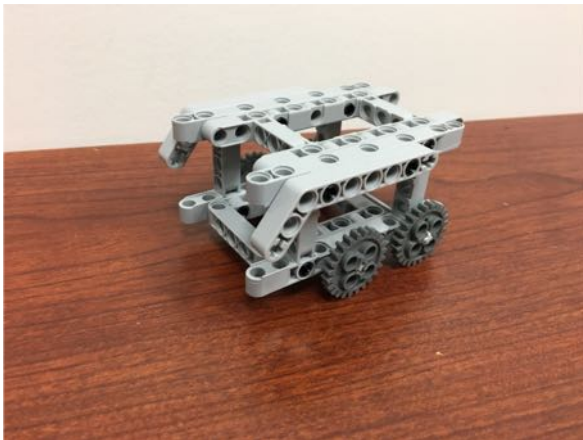
MISSION MODEL: ALLIANCE-BOTS



Small Alliance Bot



Medium Alliance Bot



Large Alliance Bot



XL Alliance Bot

ROBOT & GAME RULES

The majority of the game rules were taken from the FLL 2017-2018 game manual, Hydrodynamics. There are only a few minor tweaks for this game.

ROBOT & GAME RULES

- **GP1** - Gracious Professionalism: You are Gracious Professionals. You compete hard against problems, while treating all people with respect and kindness.
- **GP2** - Interpretation: If a detail isn't mentioned, then it doesn't matter. Robot Game text means exactly and only what is plainly says. If a word isn't given a game definition, use its common conversational meaning.
- **GP3** - Benefit of the Doubt: If the Referee (Ref) feels something is a "very tough call," and no one can point to strong text in any particular direction, you get the **Benefit Of The Doubt**. This good-faith courtesy is not to be used as a strategy.

ROBOT & GAME RULES

- **D01** - Match: A “Match: is when a team plays on a field. Your Robot LAUNCHES one or more times from Base and tries as many Missions as possible. Matches last 2.5 minutes, and the timer never pauses.
- **D02** - Mission: A “Mission” is an opportunity for the Robot to earn points. Missions are written in the form of requirements.
- **D03** - Equipment: “Equipment” is everything you bring to a Match for Mission-related activity.
- **D04** - Robot: Your “Robot” is your LEGO MINDSTORMS controller and all the Equipment you’ve combined with it by hand which is not intended to separate from it, except by hand.
- **D05** - Mission Model: A “Mission Model” is any LEGO element or structure ALREADY AT THE FIELD when you get there.

ROBOT & GAME RULES

- **D06** - Field: The “Field: is the Robot’s game environment, consisting of Mission Models on a Mat, surrounded by Border Walls, all on a Table. “Base” is part of the Field.
- **D07** - Launch: Whenever you’re done handling the Robot and then you make it GO, that’s a “Launch.”
- **D08** - Interruption: The next time you interact with the Robot after Launching it, that’s an “Interruption.”
- **D09** - Transported: When a thing (anything) is purposefully/strategically being taken from its place, and/or moved to a new place, and/or being released in a new place, it is being “Transported.” The process of being Transported ends when the thing being transported is no longer in contact with whatever was transporting it.

ROBOT & GAME RULES

- **R01 - All Equipment:** All Equipment must be made of LEGO-made building parts in original factory condition.
 - Exceptions: LEGO string and tubing may be cut shorter; program reminders on paper are okay, marker may be used in hidden areas for identification
- **R02 - Controllers:** You are allowed only ONE individual controller in any particular Match.
 - Allowed controllers: EV3, NXT, RCX
- **R03 - Motors:** You are allowed up to FOUR individual motors in any particular Match.
 - Allowed motors: EV3 Large, EV3 Medium, NXT, RCX
- **R04 - External Sensors:** Use as many external sensors as you like.
 - Allowed sensors: EV3 Touch, EV3 Color, EV3 Ultrasonic, EV3 Infrared, EV3 Gyro/Angle, NXT Touch, NXT Light, NXT Color, NXT Ultrasonic, NXT Infrared, RCX Touch, RCX Light, RCX Rotations

ROBOT & GAME RULES

- **R05** - Other Electric/Electronic Things: No other electric/electronic things are allowed in the competition area for Mission-related activity
 - Exceptions: LEGO wires and converter cables; controller power pack or 6 AA batteries
- **R06** - Non-Electric Elements: Use as many non-electric LEGO-made elements as you like, from any set.
 - Exceptions: Factory-made wind-up/pull back “motors” are not allowed; additional/duplicate Mission Models
- **R07** - Software: The Robot may only be programmed using LEGO MINDSTORMS RCX, NXT, EV3 or RoboLab software (any release).
- **R08** - Technicians: Only two team members, called “Technicians,” are allowed at the competition Field at once. Technicians are able to switch places with current Technicians at any time if desired.

ROBOT & GAME RULES

- **R10** - Handling During the Match: You are not allowed to interact with any part of the Field that's not COMPLETELY in Base.
 - Exceptions: You may interrupt the Robot any time;
 - You may pick up Equipment that BROKE off the Robot UNINTENTIONALLY, anywhere, any time.
 - You are not allowed to cause anything to move or extend over the Base line, even partly.
 - You may LAUNCH the robot.
 - You may move/handle/STORE things off the Field, any time.
 - If something accidentally crosses the Base line, just calmly take it back - no problem.
- **R11** - Storage: Anything completely in Base may be moved/stored off the Field, but must stay in view of the Ref, on a stand. Everything in off-Field Storage "counts" as being completely in Base.

ROBOT & GAME RULES

- **R12 - Launching:** A proper Launch (or re-Launch) goes like this:
 - Your Robot and everything in Base it's about to move or use is arranged by hand as you like all fitting "COMPLETELY IN BASE" as measuring no taller than 12" (30.5 cm)
 - The Ref can see that nothing on the Field is moving or being handled
 - GO!
 - Reach down and touch a button or signal a sensor to activate a program
- **R13 - Power Prisms:** A Robot may carry up to three POWER Prisms at once (defined in mission models)
- **R14 - Interrupting:** If you INTERRUPT the Robot, you must stop it immediately, then calmly pick it up for a re-Launch (if you intend one). Here's what happens to the Robot and anything it was Transporting, depending on where each was at the time:
 - Robot → completely in base = re-launch
 - Robot → not completely in base = re-launch + penalty
 - Transported thing → completely in base = keep it
 - Transported thing → not completely in base = give it to the ref

ROBOT & GAME RULES

- **R15 - Stranding:** If the UNINTERRUPTED Robot loses something it was Transporting, that thing must be allowed to come to rest. Once it does, here's what happens to that thing, depending on its rest location:
 - Completely in base = keep it
 - Partly in base = give it to the ref
 - Completely outside Base = leave as is
- **R16 - Field Damage:** If the Robot separates Dual Lock or breaks a Mission Model, Missions obviously made possible or easier by this damage or the action that caused it do not score.
- **R17:** As the Match ends, everything must be preserved exactly as-is
 - If your Robot is moving, stop it ASAP and leave it in place
- **R18 - Scoring:** The Ref discusses what happened and inspects the Field with you, Mission by Mission. Sign the sheet once you agree with everything.

MISSIONS

- **M01 - Scale Power Prisms**
 - Move a Power Prism so it is completely in the SCALE (either side)
 - 20 points per Prism scored
 - BONUS: Add 30 points if SCALE balanced (with more than 1 cube) at conclusion at match
- **M02 - Switch Power Prisms**
 - Move a Power Prism so it is completely in the SWITCH (either side)
 - 10 points per Prism scored
 - BONUS: Add 20 points if SWITCH balanced (with more than 1 cube) at conclusion at match
- **M03 - Exchange**
 - Move a Power Prism so it is completely inside the EXCHANGE zone (defined by black line on field)
 - 5 points per Prism scored up to 9 power prisms
 - BONUS: For every 3 Power Prisms scored, add 20 points
- **M04 - Ramp-Bot**
 - Move Robot such that is is completely on top of the RAMP at the conclusion of the match: 30 points
 - BONUS: If Robot fully supports Small Alliance-Bot, add 10 points; Medium Alliance Bot, add 20 points; Large Alliance Bot, add 30 points, XL Alliance Bot, add 40 points.
 - A robot is allowed to support as many Alliance Bots as it wants

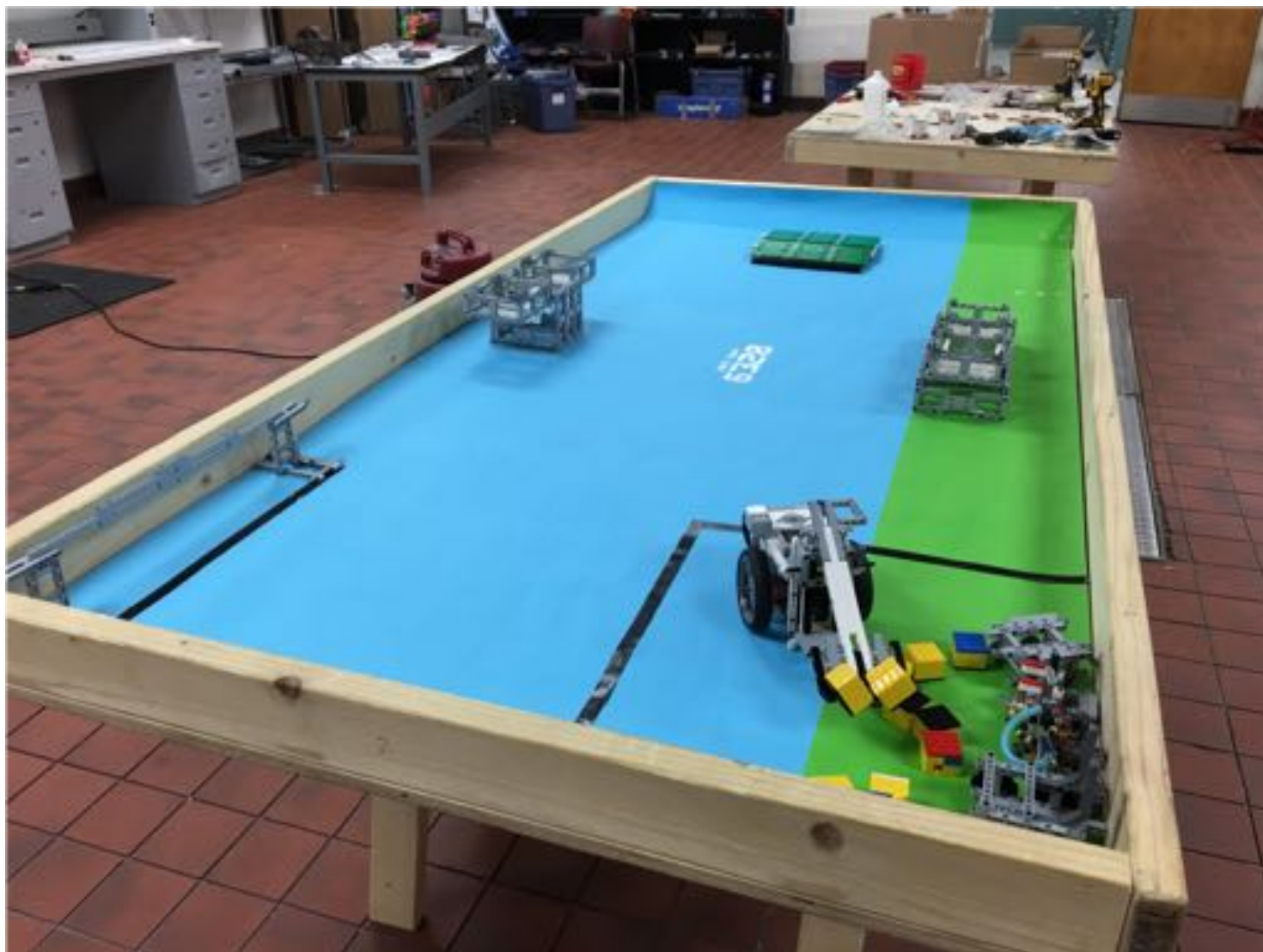
MISSIONS

- Penalties
 - Before the match starts, the Ref removes the six Red Penalty discs (from Hydrodynamics game) from the Field, and holds on to them. If you interrupt the Robot, the Ref places one of the removed Samples on the field as a permanent/untouchable Interruption Penalty. You can get up to six such penalties, worth -5 points each.

FIELD LAYOUT



FIELD LAYOUT



POSSIBLE GAME MODIFICATION

To make this game easier for students, you can modify the structure of matches as follows:

- Have students program missions normally
- During final competition/presentation, students get 5 tries to come up to field
- The sum of points achieved in the 5 runs is the team's total score
 - Missions may only be counted once

This removes the time pressure from the normal 2.5-minute match. It also allows students to create programs with individual missions, instead of stringing many actions into 1 run.

NEED MORE INFORMATION?

Looking for more information on the game or have a question? Feel free to email info@litletonrobotics.org and a member of FRC 6328 will get back to you.

Feel free to share pictures of your students' FLL PowerUP robots with FRC 6328 on social media!

- Instagram: frc6328
- Twitter: @frc6328
- Facebook: FIRST Team 6328 - Mechanical Advantage

ENJOY PLAYING FLL POWERUP!

