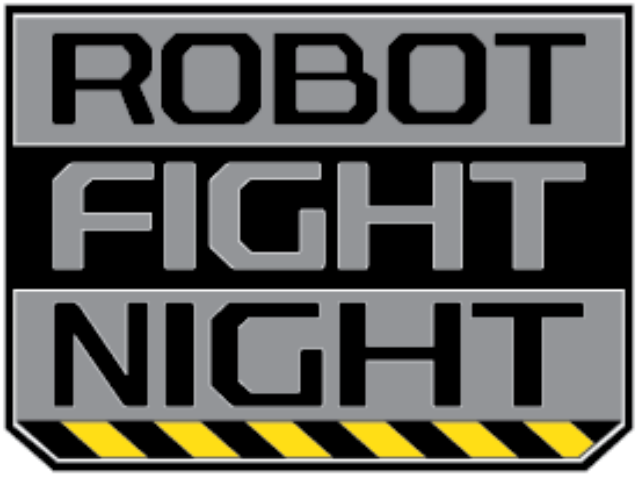


SEASON 4 (2019) HANDBOOK

FIGHT NIGHT:

VER 1.0

Foreword

Greetings to competitors and spectators alike, and welcome to another exciting edition of the famed AndyMark Fight Night. This robot combat tournament is intended to pit creativity and craftsmanship against ...other stuff.

This format for a robot started as a way to use parts and motors that we're familiar with while still making the fights not terrifyingly dangerous. Using our parts and building to a traditional battle bots weight class would likely have us all at more than 30lbs and fighting over mill time and costs significantly higher than desired. With cardboard as the main chassis material allows for simple, low cost builds that are also straightforward to fix. Plastic weapons allows for strong, simple to make devices that, intentionally, outclass the chassis they endeavor to destroy.

The first goal of this tournament is to have fun, both building and un-building the robots. One of the biggest metrics of this is a simplified building experience and even fights where both robots have a fighting chance (pun intended). The looseness, or should I say freedom in the rule book is to allow for a wide variety of robot designs and easily accessible materials. This obviously creates a contradiction between design freedom and close matchups. To this end we hope that each builder can come to an understanding of how to build a robot that will compete on an even keel with others and is fun.

For all the seriousness that many of us take competitions; I challenge, no dare everyone reading this to put that same level of effort into having fun with this build and finding joy in the endeavor and not the conquest.

For any questions, specific or existential surrounding these rules or their interpretations please feel free to reach out (fightnight@andymark.com) for a conversation and/or questions answered.

Enjoy and Good Luck
Danny - Founder

TL,DR: if you're parsing punctuation, you're doing it wrong!

And now, the following ruleset is from our Tournament Director, Nick

General Rules

G01: **Don't be a rules lawyering jerk:** Before proceeding any further, did you read the foreword? No? Go read it. Now, think about what rule you're going to lawyer. Is there a gray area? Cool, here's a gold star. Don't go and build a robot like Blade Roller from Season 2. Looking at you Nathan. Read as: build your freakin' CHASSIS out of CARDBOARD.

G02: **No throwing HATCH PANELS:** ROBOTS may not shoot HATCH PANELS into the air in any way, including kicking them across the floor using an active mechanism or ejecting them across the floor in a forceful way (i.e. HATCH PANEL is caused to move a significant distance.) VIOLATION: RED CARD.

> This Handbook is intended to prevent you from building things illegally early in the process, and is not intended to be a means for inspection before fights. As like Season 3, where we had the 'No Launching Power Cubes' rule, treat most of the General and ROBOT Rules as 'build season' rules where penalties are intended to be a deterrent, but we hope not to have to apply any of them on Fight Night.

G03: **FIRST Logo On Bumpers is Cool:** You may display the FIRST logo on your bumpers… should you choose… if that's what you want to do.

G04: **Safe practices always:** The desired death, destruction and mayhem is of the robots, not the people. There are new specific safety rules baked into the Season 4 handbook. While none of them are direct results from incidents in prior seasons, they are preventative measures to be taken seriously.

ROBOT Rules

R01: **ROBOTS can't be too big:** ROBOTS in STARTING CONFIGURATION must not exceed a maximum of 70 DIMENSIONAL POINTS, which are derived from the sum total of the ROBOT's (PERIMETER OF MAX FOOTPRINT) + (ROBOT HEIGHT-8). If the ROBOT HEIGHT is less than 8", this term will count as a zero, but won't be a negative value. ROBOTS may expand to any size after the beginning of a MATCH.

ROBOTS are to be declared what their PERIMETER OF MAX FOOTPRINT, and height are during pre-tournament inspection. To determine PERIMETER OF MAX FOOTPRINT, inspectors will wrap a non-rigid tape measure around the largest section of the robot planar to the floor in STARTING CONFIGURATION

Example 1: A cube-shaped robot with 10" long faces is the following:
(10" Length +10" Width +10" Length +10" Width +2" Extra Height= 42 Points)

Example 2: A cylinder shaped robot that is 15" in dia. and 12" tall is the following:
(~47" Circumference + 4" Extra Height + = 51 Points)

This method of size governing has been created to allow more design freedom, as well allowing some more breathing room to package ACTIVE COMPONENTS.

R02: **ROBOTS can't be too heavy:** ROBOTS may not exceed 30lbs in weight.

ROBOTS will be weighed prior to the start of the tournament. ROBOTS must be reweighed should teams choose to add items to their robot in between fights.

R03: **The ROBOT must have a CHASSIS constructed primarily of CARDBOARD:** No two ACTIVE COMPONENTS may be structurally connected to each other by anything other than cardboard, with the exception of multiple ACTUATORS into a single mechanism. ACTIVE COMPONENTS include: motors, servos, actuators, gearbox assemblies, motor and gearbox assemblies, springs, air cylinders.

In previous years, there have been provisions for protecting electronics via plastics, etc. This year, there are no such provisions. We removed these in Season 3 as they created loopholes that allowed the primary structure of the robot to not be cardboard (or balsa in years past.) There is no thickness limit this year on the frame pieces to compensate for this. The intent is to bring Fight Night back to it's roots this year and have the ROBOTS to be actually constructed with a CARDBOARD chassis.

This rule is not intended disallow a gearbox assembly to be built, with motor(s) attached, and then installed on a robot. It does however disallow multiple gearboxes to be connected together via anything other than CARDBOARD.

R04: **ACTIVE COMPONENTS cannot be too close:** No two ACTIVE COMPONENTS may be installed in a robot within 1” of each other, in any direction, in any fashion.

R05: **ROBOT CHASSIS Fastening:** In addition to the CARDBOARD, ROBOT CHASSIS sections may be fastened together using tape, glue, epoxy, screws, fasteners, cable ties. While lamination of CARDBOARD is allowed, this provision for adhesives and tapes does not allow for said materials to significantly alter the structural integrity of the CARDBOARD.

Examples of significantly altering the CARDBOARD include but are not limited to:
- Creating an ‘epoxy slurry’ of ground up CARDBOARD and epoxy
- Injecting epoxy or glue into the gaps in corrugated CARDBOARD.
- Wrapping the majority of the ROBOT in tape
- Spraying the majority of the ROBOT with Flex Seal
- Dipping the majority of the ROBOT in epoxy or glue
- Building the majority of your frame out of fasteners

Acceptable practices include but are not limited to:
- Laminating sections of CARDBOARD together with more CARDBOARD than glue
- Joining sections of CARDBOARD together with modest amounts of glue, fasteners, tape

Note: This rule is not intended to prevent you from fixing your damaged ROBOT after a fight with significant amounts of tape, glue, etc.

R06: **WEAPONS made of PLASTIC:** WEAPONS may only be constructed from any long-chain polymer homogenous plastics, as well as Euroboard / Alumalite sign board materials. WEAPONS and WEAPON powertrains may also include metal axles, fasteners, hubs, etc. These metal components may not be used as the damaging components of your WEAPON.

Fasteners used to overly enhance a weapons destructive ability (such as sharp bolts, or excessive fasteners to increase weapon weight) are not allowed. We understand this is a gray area, please see Rule G02.

Non-homogenous plastics (such as Corian, looking at you Nathan,) are not to be used and are not within the intended spirit and desired level of destruction of AndyMark Fight Night

R07: **Plastic WEAPONS must be active:** Plastic WEAPONS for Robot Fight Night must be active in nature. They must have their own dedicated actuators to power it, and must obviously be designed to cause significant damage, incapacitation or disablement via their own actuators. Mechanisms or structures powered by your drivetrain (such as non-moving wedges, knives, or other armor), or intended to primarily cause damage via drivetrain propulsion, are not considered WEAPONS, and would have to be constructed of CARDBOARD.

R08: **WEAPONS can’t be too scary or unsafe:** The damaging components of WEAPONS may not include obvious or intentional liquids, fire, explosives, radio jamming, untethered projectiles or entanglement devices.

R09: **Mount plates are cool:** Individual plastic and metal motor and bearing mounting brackets in conjunction with fasteners can be used so long as:

- They are more than 2” apart from other individual brackets (in any direction)
- They do not exceed a 6” x 6” x 1” size, each.
- They are only used for mounting motors or bearings.

This is intended to allow for a stable and easy way to add motors and bearings to your ROBOT, not to allow you to use your motors and such as structure for your ROBOT.

R10: **ACTUATORS by points:** For mechanisms that provide propulsion, damage, self righting, or other strategic uses, ROBOTS are limited to 24 ACTUATOR POINTS for Season 4. Teams may use any combination (from the below table) of ACTUATORS so long as the ROBOT’s total ACTUATOR POINTS do not exceed 24 points. Actuators that provide no strategic advantage (I.E. a Non Functional Decoration, cooling fans, etc) are limited to be equal to or less than the power of a NeveRest motor. Expect ACTUATORS claimed to provide no strategic advantage to invite extra scrutiny during inspection.

ACTUATOR POINTS ALLOCATIONS		
ACTUATOR TYPE	**MAX RATED WATTAGE @12V**	**POINTS PER**
Unlisted Brushed DC Motors (ex, Cordless Drill)	400	14
RedLine (am-3775, am-3775a) 775Pro	363	12
CIM, MiniCIM Motor	337	12
Pneumatics (any system)	LOL	12
Banebots RS-775	246	12
Banebots 550	190	8
9015 Motor	134	8
Unlisted Brushed DC Motors (ex, Cordless drill)	150	8
NeveRest, REV Hex HD	14	4
AM775 Motor (am-2194 or similar)	43	4
Servos (Equivalent to AndyMark offerings)	10-40 (@6V)	2
Denso Throttle Motor (From *FRC* KOP)	20	2
Unlisted Small Brushed DC Motors	10	2

In order to compete with unlisted brushed DC motors, you must present manufacturer’s documentation showing maximum rated wattage. For all unlisted motors from 11-150W, a value of 8 points has been assigned. For all unlisted motors from 151-400W, a value of 14 points has been assigned. Motors that exceed 400W are not legal for competition. Brushless motors may not be used for any strategic advantage.

R11: **Usual ROBOT power transmission and drivetrain stuff is cool:** Gears, bearings, metal axles, sprockets, chain, hubs, belts, wheels, gearboxes, casters, sliders etc are all legal components to use, so long as they aren't used as robot structure, nor damaging components of weapons, but are used only to provide or enable motion to your ROBOT's mechanisms. No, you don't have to make wheels out of cardboard. Stop that, stop it right now.

R12: **Not too much powuh, now:** System voltage of ROBOTS is limited to 28V max, as governed by the manufacturer's ratings of batteries.

R13: **No Li-Po Batteries:** Due to the lack of allowance for static battery-protection materials, Li-Po batteries of any kind are not allowed for Season 4. Unmodified Li-Ion cells may only be used within unmodified tool batteries. Modified Li-Ion based tool batteries or cells are explicitly not legal.

Look, batteries of all types are scary in a combat robotics environment. We're drawing a line in the sand with Li-Fe batteries specifically, but expect all batteries and their installation locations to be inspected during weigh-in. Custom packs built from NI-MH cells for example are legal, but will be carefully inspected to ensure their safety.

R14: **BYOCS - Bring Your Own Control System:** The ARENA is dumb. It has no control system. Use what you want.

R15: **No CNC Machining:** Custom ROBOT components may not be manufactured with CNC machining or cutting equipment. Part of the spirit of AndyMark Fight Night is to get people into the shop building cool stuff with their hands. Making parts with the help of printed templates (from a paper printer) is acceptable. Cutting nonfunctional vinyl graphics with a computer controlled cutting machine is fine too.

R16: **No Season 1 or 2 ROBOTS:** ROBOTS built for AndyMark Fight Night Seasons 1 or 2 are not eligible to compete in Season 4. These robots were constructed with Balsa wood and may end up being stronger than robots from Season 3. Reused Season 3 robots such that they still meet the season 4 rules are allowed

R17: **Keep spindown times low:** The ROBOT must dissipate all of its kinetic energy within 60 seconds of disablement / power being removed etc.

R18: **Wireless control only:** ROBOTS must be controlled wirelessly and may not be tethered to any controls outside the ARENA.

R19: **Gotta stop your bot:** ROBOTS must be able to be deactivated (and dissipate all kinetic energy) via their wireless controls outside the arena and without direct human intervention to the robot.

R20: **Gearboxes can't be too big:** With the exception of it's output shaft(s), any gearbox or actuator assembly may not exceed 6"x6"x3"

R21: **Don't use your battery as structure:** The ROBOT Battery may not be used as structure. The ROBOT must remain structurally intact and structurally unchanged if the battery is removed.

> Batteries may be installed behind removable sections of the ROBOT CHASSIS. This rule is not intended to outlaw burying your batteries inside your robot, just to ensure they are not holding your robot together.

R22: **3D Printed Parts are Cool, mostly:** ROBOTS may utilize plastic 3D printed parts for brackets, motor mounts and power transmission components provided they conform to all other rules governing said components. 3D printed components may not be used as plastic for WEAPONS.

R23: **MeltyBrains are Cool:** MeltyBrain style ROBOTS are legal for 2019. ROBOTS specifically of this archetype are exempt from the requirement of having a separate CHASSIS and ACTIVE WEAPON system. Additionally, MeltyBrains may have non-defensive plastic impactor tips. An individual tip may not exceed 3" x 1" x 0.5" in size, and the total coverage of tips on the edge(s) of the ROBOT may not exceed 25% of the total perimeter.

> Use this ruling wisely. The intent of allowing this type of ROBOT is not to allow the robot to be constructed with an entire defensive perimeter of PLASTIC, nor with a plastic chassis. By nature of combining the WEAPON and CHASSIS, this specific type of ROBOT must still be constructed primarily of CARDBOARD.

Safety Rules

S01: **ROBOTs can't live forever:** All ROBOTs must have a manually operated master kill switch installed or removable link. This switch or link must shut off main weapon and drive power. A remotely operated relay or contactor to break main power does NOT fulfill the killswitch requirement. The switch or link must be quickly and easily accessible. Having to remove armor panels etc. to access the switch is not acceptable, however the switch may be operated directly via the use of a tool (such as a hex key). A single switch or removable link is preferred, but two switches/links will be allowed if they are both easily accessible.

S02: **Reasonable batteries please:** Batteries must be sealed, immobilized-electrolyte types (such as gel cells, lithium, NiCads, NiMH, or dry cells). Internal combustion engines are NOT allowed.

S03: **WEAPONS gotta be safe:** ROBOT WEAPONs, that could harm a person outside the arena to a reasonably astute observer, must have either a mechanical locking device or be easily removed in case of accidental activation. WEAPONS must be locked out at all times except in the ARENA.

The intent of this rule is to ensure that any dangerous weapon system (such as a flat bar spinner) cannot activate under any circumstances outside of the ARENA.

Example 1: A horizontal flat bar spinner could be considered locked out if:

- A locking device that prevents the weapon from spinning relative to the ROBOT is installed
- The weapon motor is obviously and unambiguously unplugged wwithout having to cross the path of the WEAPON to unplug
- The weapon bar itself is quickly removed from the robot

Example 2: A vertical lifting mechanism could be considered locked out if:

- A locking device that prevents the weapon from moving relative to the ROBOT is installed
- The weapon motor is obviously and unambiguously unplugged without having to cross the path of the WEAPON to unplug
- The lifting mechanism has no external pinch points
- The lifting mechanism is not fast enough to cause an impact-based injurt

Keep in mind that if you choose to design your robot to be able to remove the WEAPON, the process to either remove or install the WEAPON must take less than 10 seconds to help us keep the tournament on time.

This will be one of the most important aspects of the safety inspection. Be prepared to demonstrate your WEAPON lockout device or procedure, or to prove your WEAPON does not pose a threat to others outside of the ARENA. When in doubt, the safest options are to remove the WEAPON or have a physical lockout device.

We highly recommend that you reach out to fightnight@andymark.com ahead of time to verify that your WEAPON lockout procedure will be sufficient.

S04: **No WEAPONS in the PIT**: WEAPONs must remain locked out while ROBOTS are transported to and from the ARENA, but also while in the pit working area. WEAPONS may not be fully tested anywhere except for in the ARENA. If you need to test WEAPON powertrains, you must remove the dangerous components of the WEAPON prior to testing, or request to utilize the ARENA (between MATCHES or before the tournament begins).

S05: **Not too much pressure:** ROBOTS may not contain pneumatic systems with pressures above 120psi.

S06: **Unprotected batteries are bad:** While there are no direct provisions to armor your batteries with plastics or metals, you must make attempts to protect your batteries within your CHASSIS or under your WEAPON in some manner. ROBOTs with obviously exposed unprotected batteries are not safe and will not be allowed to compete.

TL;DR - Hide your batteries within your robot as best as you can.

S07: **Damaged batteries are bad:** Batteries that have been damaged to the point where either individual cells are visible, or cells have obviously taken damage are not allowed to be used in MATCHES.

S08: **ROBOTs still have to be reasonably safe:** The AndyMark Fight Night Committee reserves the right to disqualify, at any time, any robot that poses a threat to anything other than the arena surface or its opponent(s). If you have a questionable design, please send an email to fightnight@andymark.com before proceeding

S09: **Gotta have a failsafe:** All ROBOTS must have a failsafe for weapon and drive. When the drivetrain and weapon are powered and the radio transmitter is then turned off, both the drive and weapon must quickly come to a stop and remain motionless.

Tournament Rules

T01: **MATCHES are 3 Minutes:** Each MATCH will be up to three (3) minutes in length.

T02: **Ranking Matches:** The opening round of the tournament will consist of 3 ranking matches for each robot. Match-ups will be determined according to the following conditions:

RANKING MATCHES	
ROUND	**DESCRIPTION**
1	Grudge matches (brought to you by call-outs prior to the event) and housemates who each build ROBOTS.
2	Grudge matches (brought to you by call-outs prior to the event) and housemates who each build ROBOTS, and Committee's Choice to create competitive and entertaining matches.
3	Final seeding: Matches are randomly generated from the top and bottom halves of the current RANKINGS. You will be randomly selected to fight another ROBOT in your half of the RANKINGS.

T03: **Ranking Points:** Throughout the Ranking Matches, ROBOTS seek to collect as many Ranking Points as possible in the quickest time possible:

RANKING POINTS ALLOCATIONS	
RANKING POINT TYPE	**RP**
Knockout	7
Technical Knockout	5
Judges Decision	1 Per Judge
Helping a Turtle	2

T04: **ROBOT Rankings:** Throughout the Ranking Rounds, robots will be ranked according to:

TOURNAMENT RANKING		
ORDER SORT	**CRITERIA**	**SORT TYPE**
1st	Average Ranking Points	Highest to Lowest
2nd	Average Match Length*	Lowest To Highest
3rd	Fastest Knockout Time	Lowest to Highest
4th	Thumb War or Sudden Matchup	Competitors' Choice

*If a ROBOT loses a MATCH in any way, they earn a 3:00 Match Length for that MATCH.

T05: **Winning with authority:** ROBOTS will be awarded Knockout Ranking Points (7) if their opponent:

- Ejects, leaks, or spills their battery
- Catches fire (except for motor smoke)
- Has had it's drive/propulsion systems removed from the robot (i.e. can no longer move)
- Concedes defeat
- Has been broken into several pieces that no longer resemble a ROBOT

T06: **Definitely winning, but strategically:** ROBOTS will be awarded Technical Knockout Ranking Points (5) if their opponent:

- Is unable to make meaningful translational movement for a 10 second period
    - Drive malfunctions (but not destruction)
    - Getting stuck on debris in the arena
    - etc
- A majority of their robot gets thrown from the ARENA

We understand that the lines between a Knockout and Technical Knockout are not always obvious. The final determination of whether a match has ended due to a Knockout or a Technical Knockout will be made by the Tournament Director.

T07: **Not always a knockout:** Should a MATCH run the entire length without a Knockout or a Technical Knockout, the outcome of the MATCH will be determined by three judges. In this situation, ROBOTS earn one (1) Ranking Point per judge that determines they have won that MATCH. You do not have to win the MATCH to earn these ranking points. Judging criteria includes:

- Number of hits
- Control of the MATCH
- Strategy
- How much money each team has given to the Judge(s).

T08: **Keep the match going:** ROBOTs may earn bonus Helping a Turtle Ranking Points if their opponent becomes stuck on debris in the ARENA, tips over, or is somehow restrained from movement via situations other than a ROBOT malfunction, and they successfully free their opponent from this situation. This bonus ranking point may only be earned once per ROBOT, per MATCH. ROBOTS do not need to be declared the winner of a match to earn these Ranking Points.

T09: **Elimination Matches:** At the conclusion of the Ranking Rounds, the top 16 robots left standing will compete in a single elimination bracket to determine our CHAMPION. Standard bracketology, 1v16, 2v15 etc. Ranking points no longer apply. Matches are won via: Knockout, Technical Knockout, or a Majority Judges decision. Helping a Turtle gets you nothing but good karma.

T10: **Elimination Forfeits**: If a ROBOT is not able to make call time, their opponent is declared the winner and advances. If neither robot can make call time, no-one wins and we're all sad (their next round opponent also gets a bye as well).

The Tournament Director has the authority to adjust or tweak the bracket if necessary, to have a good show for all while give the remaining competitors a reasonable tournament.

T11: **Rumbles:** These are just for fun exercises in destruction! Winners are crowned by 1) Last robot standing, 2) Fan Vote via applause-o-meter. The Tournament will use Rumbles to fill some of the gaps in the schedule and to allow for longer breaks in Elimination Matches. They are open signup and not capped on the number of robots per rumble.

T12: **ROBOTS must start from rest:** Each robot must begin the MATCH at 'rest' meaning it may not have any component of it's robot contain any kinetic energy at the start of the match.

> Stored potential energy from deflection of robot parts, gravity, electrical energy, etc are not a violations of this rule.

T13: **There's a 5-count on pins.** ROBOTS may not pin (or otherwise hold) an opponent's ROBOT for more than five (5) seconds. A ROBOT will be considered pinned until the ROBOTS have separated by at least two (2) feet. The pinning ROBOT must then wait for at least five (5) seconds before attempting to pin the same ROBOT again. Pinning is transitive through other objects. If the pinned ROBOT chases the pinning ROBOT upon retreat, the pinning ROBOT will not be penalized, and the pin will be considered complete. VIOLATION: TECH FOUL

T14: **The ARENA is (sort of) cleaned:** After each MATCH, remaining debris in the ARENA will be swept into a PILE in the middle of the arena, between the two STARTING BOXES. This is available for your own advantage, or disadvantage during matches.The PILE will start the tournament with a single fuel ball.

T15: **Gotta keep moving:** If during a portion of the tournament, both robots from a MATCH are considered to be incapacitated and irreparable, their prospective opponent will get a bye and advance to their next round.

T16: **You might like to know the ARENA:** The ARENA will have a flat polycarbonate floor, 11ft x 11ft with a 1ft wall. The ARENA in enclosed by a 12x12x4ft Battlebox for the safety of the humans.

T17: **Pass Inspection:** All robots must pass a safety, size and weight inspection prior to their First MATCH.
VIOLATION: Jeff hits your robot with a hammer of his choice once, as hard as he wants.

T18: **32 Spots:** The TOURNAMENT has a maximum capacity of 32 ROBOTS. Teams may enter multiple ROBOTS if they wish.

General Logistics Notes

Registration

A ROBOT is considered registered once the team sends an email to fightnight@andymark.com with the following information:

- Team Name
- Robot Name
- Robot Technical Description
- Team Roster
- Primary contact email

The deadline to sign up and complete registration is **July 12, 2019.** Registration spots are given on a first come, first served basis.

Date and Schedule

We are still working to finalize the date for Fight Night but the following are the remaining possibilities:

- August 10th, 2019
- July 27th, 2019
- July 20th, 2019

As we're increasing the total number of matches, we've moved the tournament to a Saturday afternoon schedule. A final event schedule will be released in the coming weeks, but we anticipate Fight Night load in to begin around 10AM and have the Final Match around 9PM, with the event complete by 10PM.

Likely Locations

- Tin Man Brewing, Kokomo, IN
- AndyMark, Inc, Kokomo, IN

OFFICIALLY SIGNED UP ROBOTS - TEAMS

Robot Name - Team Name

1. PEGA-MERMA-CORN - SO EXTRA!
2. TBD - Team RocketCat
3. Rutherford B. Afraid - Ruthless
4. Dumpster Fire - Dumpster Fire
5. TBD - Team Nathan
6. EF3 - Rainbow Tornado
7. TBD - Team Lost to SpinCycle
8. Cannonbowl - RiverRocket
9. Phantom - Aberrant Robotics
10. Sword - Black Knights
11. Pun-Slinger IV - Team South Heckin' Carolina
12. Piece Of Cake - Team Scrumbtious
13. Nature Bot - Team Nature Bot
14. M18 FORCE LOGIC CRIMPER - Milwaukee Tools
15. TBD - Team Buckie
16. Mr. DooM II: Pain Elemental - Hidden Z
17. "Vex Gon' Give It To Ya" (VERY Tentative) - TBD
18. Your guess is as good as mine (TBD) - Inaccurate Certainty
19. TBD - Team Alternative Animals
20. The Finger - Fainting Goats
21. TBD - Team SC
22. Don Quixote - TaylorMade Robotics
23. Twenty Bucks - Meadpool
24. Cha Cha Slice - FIM DJ
25. Tart - Half Baked Designs
26. Mean Joe - 3620 Mentors
27.
28.
29.
30.

GLOSSARY

TERM	DEFINITION
ACTIVE COMPONENT	Motors, servos, actuators, gearbox assemblies, motor and gearbox assemblies, springs, air cylinders, or any device capable of directly providing kinetic energy, torque or motion.
ACTUATOR POINTS	Points assigned to an individual or type of actuator.
ARENA	The area in which ROBOTS play MATCHES.
CARDBOARD	A paper-based material from which robots are primarily constructed. The only legal forms of CARDBOARD include: chipboard, corrugated fiberboard, honeycomb/hexacomb board, shipping tubes, laminated paperboard, compressed paperboard
CHASSIS	The load bearing base frame of a ROBOT comprised primarily of CARDBOARD which supports the weight of the WEAPON, CONTROL SYSTEM and all other components.
CONTROL SYSTEM	The electrical system that manages control signals and power throughout the ROBOT.
DIMENSIONAL POINTS	Points based on size and weight of a ROBOT.
IMMEDIATELY	At once; instantly; without any intervening time or space
MATCH	A three (3) minute period where ROBOTS fight in the ARENA
MATCH WIN	An award that causes advancement of a ROBOT based on their opponent's incapacitation, or judges decision
PILE	The debris swept into the centre of the ARENA between matches
ROBOT	An electro-mechanical device comprised of at least a WEAPON, CHASSIS and a CONTROL SYSTEM with its primary purpose to deliver (ROBOT) death destruction and mayhem, that has passed inspection.
STARTING CONFIGURATION	The declared size and weight of which a ROBOT starts a MATCH in, based on it's inspected DIMENSIONAL POINTS.
TECH FOUL	A penalty of sitting still for 15 seconds. This may apply at the beginning of your next match, during your current match or in all matches you play.
WEAPON	The component or system of a ROBOT, to a reasonably astute observer, obviously intended to inflict significant damage or otherwise incapacitate another ROBOT via their dedicated ACTUATORS and plastic components

OFFICIAL Q&A:

New for this year, the Q&A system has changed to encourage asking more detailed questions. This year, all questions must be sent to fightnight@andymark.com. The AndyMark Fight Night Rules Committee will make a determination of legality and form a response. If you're cleared, you'll get private response. If your proposed question, situation, design, etc is deemed illegal, then this section will anonymously detail the question and response.

Because they are still mostly valuable, here are the questions and answers from last year:

1. Q: Is MDF, or wood-based chipboard legal?
    - *A: No. The intent of 'chipboard' is for paper-based products, similar to what you would find as picture frame matting. See this as an example.*
    - *EDIT: If it's in the lumber aisle, no bueno.*

2. Q: The rules only specify that "ROBOT components" can't be made with CNC equipment but they do allow tools created with (specifically paper) printers (which are CNC). Is the use of other CNC equipment to create tools to facilitate in the hand crafting of ROBOT components permitted?
    - *A: Yes.*

3. Q: Is AndyMark providing Cheap and Dirty control systems or must we source our own?
    - *A: You must source your own control system.*

4. Q: Are cardboard tubes legal?
    - *A: Yes.*

5. Are standoffs allowed to connect sections of CARDBOARD together?
    - *A: Yes. You may connect sections of CARDBOARD together with standoffs and fasteners. You may not build your robot out of excessive standoffs and fasteners. As guidance, keep your standoffs few and far apart. For guidance, please see rules G02 and R02.*

6. Is it legal to build a 'gearbox' to be a drive module, such as two plastic parallel plates with wheel(s) between them?
    - *A: Yes, provided no other rules are violated. As guidance, only one face of this 'gearbox' should be attached to cardboard, and the rest of it should be cantilevered to avoid using this 'gearbox' as a structural component of your ROBOT.*

7. Is it legal to use PVC pipe fittings to join cardboard tubes together?
    - *A: Yes, provided no other rules (specifically R05, & R09) are violated.*

8. Provided the size outlined in R19 is not violated, is it legal to bolt two individual planetary gearboxes together (such as two NeveRest Sport gearboxes,) to form an individual gearbox unit?
    - *A: Yes, provided the size outlined in R19 is not violated, and the unit is not integral to your CHASSIS structure. As guidance, only one face of the assembly should be attached to the CHASSIS.*

9. Which components need to be combined to define a motor as a motor?
    - *A: The armature, the casing, the bearings, the permanent magnets, and the output shaft must be present and assembled together such that the motor retains its original performance characteristics to consider it a MOTOR. Any of these individual components not used in conjunction with each-other fall under the BRACKETS rules.*

10. Which components of a motor can I modify?
    - *A: You can modify the output shaft, casing, flux ring, encoder, power leads, provided the answer to Q9 still remains true about the MOTOR.*

11. Is it legal to decompose Euroboard/Alumalite into just aluminum sheets to create a WEAPON?
    - *A: No.*

12. Would it be legal to use CNC to fabricate a COTS part, or pay a supplier to do so? Within the rules, I can spend $170 on McMaster to buy fat metal spur gears, then find someone with a lathe I can use to remove the hub, bore them, and broach them for a hex. However, I might be able to find someone with waterjet or wire EDM access who can cut the gears out of a sheet of metal for me for much cheaper.
    - *CNC machining an **exact copy or replica** of a COTS part is allowed. However, the situation you describe where you are also adding machined features not available in the COTS part gives you an advantage that is not within the spirit of AndyMark Fight Night. While one of our goals is not to be super expensive, we're also trying to keep a level playing field for all competitors. In your situation, what you are describing ends up as custom CNC parts, which is not allowed.*

13. I see no requirement that we have control over all moving parts of the robot. Can we have a device connected directly to the battery (through the main power switch) that will always be spinning when the robot is on? Such a device (in my application) would pose no danger to humans.
    - *A: No, please see T12: Each robot must begin the MATCH at 'rest' meaning it may not have any component of it's robot contain any kinetic energy at the start of the match.*

14. Is it in the spirit of the rules to mark my cardboard using a CNC machine like a laser cutter rather than do the full cut? The final cut would be performed manually.
    - *A: We feel this is not within the spirit of AndyMark Fight Night. We do however allow printing out of paper templates to use to cut out your CARDBOARD.*

15. We are permitted to use brackets structurally? or ONLY to mount motors and bearings? Like, can this bracket be used on the outside corner of a rectangular frame to fasten 2 flat sections together.
    - *A: No. The provision of metal and plastic brackets is not to hold your chassis together, but to allow for solid mounting of motion components. Please see R09.*

16. Can you deconstruct and reconstruct a legal form of cardboard to make a stronger form of cardboard?
    - *A: In the literal sense, technically there are ways of doing this. However, the blue box under R05 provides some guidance. For example, it would be legal to de-laminate corrugated cardboard and reconstruct it in some way, like laminating the non-corrugated sections together.. It would not be legal to shred CARDBOARD or turn it into a dust, and then re-cast it into something via water, epoxy, etc, as this would significantly alter the structural integrity of the CARDBOARD. The general guidance is that if you can still identify the individual layers, it's probably not 'significantly modified.'*

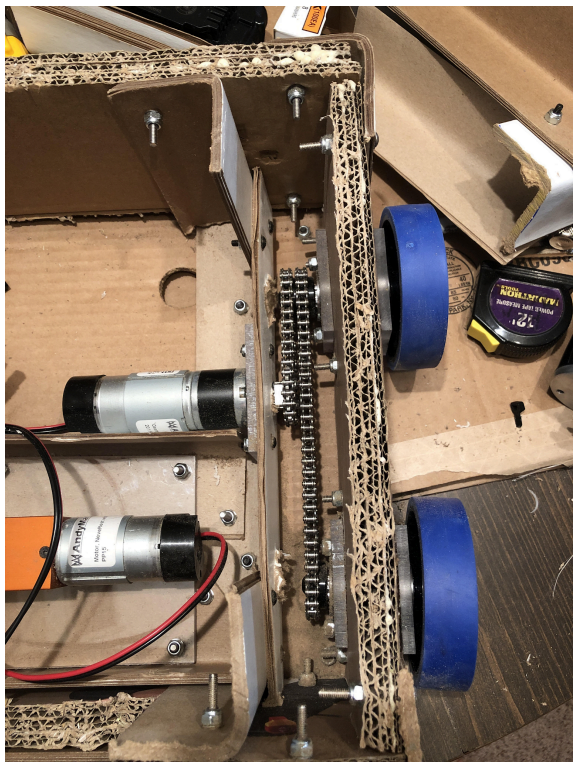
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17. Would contained (i.e. not able to hit an opponent's robot) metal flywheels for the purposes of increasing a weapon's inertia, not contacting or causing damage to an opposing robot, be legal with R06? Not sure if I could make one fall under the classification of "hub". Think 118's bronze flywheel in 2017
    - *A: Thanks for this question. Devices that are present in a weapon powertrain, or as part of a weapon that are explicitly/solely to increase its kinetic energy via rotating mass is not within the spirit of AndyMark Fight Night, nor legal per R06.*

18. Hello, we were confused by the wording of the blue box for rule R13. Are Li-Fe batteries allowed or not?
    - *A: Hello, thanks for reaching out. We'll push a team update to clarify this, but we're basically trying to specifically outlaw any lithium based battery that is not an 18650/A123 cell that is part of an unmodified COTS tool battery. We're recommending teams gravitate towards older more stable NiMH packs if they aren't using tool batteries.*
19. Are we permitted to remove or circumvent the temperature sensors found in some batteries?
    - *A: In lithium based tool batteries, removing/bypassing/defeating the temperature sensors or the battery management systems would not be permitted. In non-lithium based batteries, the temperature sensors may be removed.*

20. Can I use metal bars for actuator arms or levers attached to my weapon? I'm worried about plastic arms breaking under force.
    - *A: No. Unless it is a hub or a rotating shaft as part of the WEAPON assembly powertrain components, it must be constructed of plastic. Otherwise, it would be legal to build a lifter (almost) entirely of metal components, which is not the intent of the allowance for metal components of the WEAPON.*
21. One, fight cards. T02 states housemates have to fight one another in the initial rounds. I feel somewhat unsavory about this because of the wide resource gap between me and my housemate. I will be able to spend way more money and time on my robot, so while I am more than happy to fight under-resourced opponents, I definitely have a pretty big unfair advantage in that regard. I could see room for a provision where in quals, an under-resourced bot could get one veto to use, or allow them to pull a new fight if they don't want to fight a bot that costs triple what theirs does. This could drive some self selection for evenly matched and exciting fights, even if it means I have to fight more SpinCycles. This of course could not apply for the sweet 16.
    - *A: Teams will have multiple opportunities to compete in several matches. This rule is functioning as expected. History of this tournament very clearly shows that robot effectiveness is not correlated to input time and money.*
22. How much of the tool battery casing do I need to keep? Upper structure on the battery has tall removable plastic features that allow for mounting to the drill, but serve no electrical purpose. Can I leave that off and just cover the battery in giant heat shrink like most batteries have? The cells are well protected by solid plastic even without the upper structure that mounts to the drill.
    - *A: All of it. Part of the challenge is to use the parts given/allowed, and this is one of those challenges. There are ways to 3D print interfaces for these tool battery connections.*

23. Had a re-read of the rules tonight, and wanted to check on a few things before I build too much more - I'm pretty sure this is illegal under the first bullet point of R9, but I wanted to verify for sure that my WCD configuration isn't legal right now and I'll need to figure out another way to brace the back bearing: Also, I'm confused by the word 'actuator assembly' in the text and wanted to make sure I'm not breaking any other rules with my drivetrain config other than R9 (specifically curious about what I have with reference to the 6x6x3 limitation).

    - Thanks for sending this in. Because your WCD blocks are individual brackets, they would indeed be illegal under R09, specifically because they are closer than 2" to each other. You may be able to integrate the motor mount plate on the rear wheel to hold the bearing, and so long as that bracket is 2" apart from the outer bearing block, you'd be fine. Additionally, if they are only connected structurally via CARDBOARD, then that assembly would not fall under the scrutiny of the gearbox rules. The term 'ACTUATOR ASSEMBLY' is intended to govern the size of a non-cardboard gearbox, belt box, chain box, etc.
24. Per update 22 which permits 3D printed (plastic) battery interface methods can we manufacturer battery interface devices out of plastic using subtractive (non-3D printing) methods? Additionally, can such items be used to mount the battery safely and securely in the robot?
    - Thanks for this question. Yes this is fine, so long as the battery interface device is not structural to the ROBOT. As guidance, only one face of this 'interface device' should be attached to cardboard, and the rest of it should be cantilevered to avoid using this battery assembly as a structural component of your ROBOT.

Team Update 01:

Hi Teams!

Thank you all for signing up for AndyMark Fight Night 2019! We were very excited to see registration fill up very quickly. We had enough interest to generate a wait-list, even! With 32 teams, this looks like this is going to be an extremely exciting event! We're going to put out (semi) regular updates like this to teams via their main contact emails to give logistics updates, as well as remind teams of new Q&A updates that required public answers.

We are currently drafting the final schedule for the day, but we are pleased to announce that this year's tournament will take place on **Saturday, July 20th, 2019.** This will be a big tournament, with the first fight beginning at 2PM EDT, and with the final round finishing by 8PM EDT. We are also pleased to announce that the City of Kokomo is donating many services, including bleachers, portable bathroom facilities, but also the closure of Buckeye Street in Kokomo, Indiana. The arena will be on Buckeye street, with a floor made of wood structures and a surface of polycarbonate sheeting. Because Buckeye is an old cobblestone street, the arena will not necessarily be completely flat across the entire floor, but should be locally flat enough that robots with at least 1/2" of ground clearance should not have a problem traversing the arena.

If you need to drop from the tournament based on this date, please let us know ASAP! We do have teams on our waiting list who are eager to compete, and we'd like to give everyone as much notice and opportunity as possible to compete.

We've received a few questions regarding if a ROBOT requires a WEAPON. The definition of ROBOT in the glossary is:

An electro-mechanical device comprised of at least a WEAPON, CHASSIS and a CONTROL SYSTEM with its primary purpose to deliver (ROBOT) death destruction and mayhem.

Additionally, a WEAPON is defined as:

The component or system of a ROBOT, to a reasonably astute observer, obviously intended to inflict significant damage or otherwise incapacitate another ROBOT via their dedicated ACTUATORS and plastic components.

To be completely clear, we adjusted these definitions from last year to ensure all ROBOTS have an actual, active weapon intended to harm their opponent's ROBOTS. **We are specifically not looking for cardboard-only wedge robots, or wedges with small/ineffective actuators that are intended to skirt the rules.** These robots have competed and have been legal in the past, we're intending all teams to build damaging weapons for 2019.

Team Update 02:

Hi Teams!

(Sorry this took so long. Vacations are good. This is a long update. Please read all of it, it is full of very important information.)

We're inside of two weeks until Robot Fight Night 2019, presented by AndyMark, Tin Man Brewing and the City of Kokomo. Or, Robot Fight Night 2019 for short. We've adjusted the name of this event to better reflect the balance of partnership between AndyMark, Tin Man Brewing and the City of Kokomo. This should be a great event! When posting Fight Night related things on social media, be sure to use the **#RobotFightNight2019** hashtag so we can keep everything nice and consolidated.

Coming early next week (I promise!) in Team Update 03, we'll have a more detailed event schedule - but you should plan to arrive to the pit area by **11am EDT** so we can get photos of your robots and get through inspection. It also gives you some time to get things in order and grab a bite before the tournament.

Some teams have asked what their match turnaround will look like. **Each team is expected to play at least three matches.** We'll start our opening round at 2PM, where each robot will fight once. With 26 robots, that's a maximum of 13 matches per round, for a total of **39 qualification fights.** We'll do our best to stagger the schedule, but in the qualification round you should expect 45-90 minutes between your first three fights. We're going to attempt to run six minute match cycles, with a short break between each of the three rounds. Not every match will go the full distance, and we're counting on that to keep time. 42 matches is over **four hours** of robot fighting, so we'll need some help keeping on schedule. **Please be prepared for your fight time!** We're going to have enough space to que up three to four matches up by the arena. These will be some of the best seats in the house of other fights, a reward for getting ready on time. After the qualifications, we're going to keep pace at six minute cycles through the Sweet 16 and Quarter Final Rounds. **If you make it to the semi finals, you will be asked to remain by the field in the queuing area in order to keep track of teams and keep time.** There will be tables and a limited amount of power strips available.

The pit spaces are going to be a little cozy. You will have up to half of an 8ft banquet table for your pit space, with no power strip provided at your pit table. In the pit area, there are plugs available along the walls for you to charge batteries and such, and we'll do our best to provide power strips for this space but if you have power strips please label them as your own and bring them! **Please do not run extension cords throughout the pit area.** Please do your best to be good neighbors and accommodate the lack of table space we will have. We apologize for the inconvenience, and will look to improve the pit area amenities for next year.

The pit area will not be open to the public, on check in each of your team members will receive a wristband. This grants you access to the pits, as well as the queuing area and arena. **There will be a designated area for non-driving team members to hang out near the Arena, but it will not accommodate more than 10-12 people at once.** Please be considerate when choosing who will get your wristbands on your team. If they'd be cool with watching from a wide variety of great locations not within the team-access only areas, please encourage them to do that.

Inspection will take place as quickly and efficiently as possible this year. **As part of the inspection process, we will be taking photos of your robot to be used on our twitch broadcast!** Please arrive to inspection photo-ready so we can help make your wonderful robots look good on the internet. Size and weight will be measured, with **weight being a limit.** The robot will be inspected for safety, and for rules compliance. The earlier you arrive, the faster you can get through inspection.

Since we've had some questions regarding batteries, we want to be very clear: **The only lithium-based batteries that are legal for Robot Fight Night 2019 are unmodified power-tool batteries. Do not skirt this rule, do not lawyer this rule. You may not use hobby-grade lithium-based batteries for this tournament!**

As a reminder, please check out the safety rules. We will be enforcing every single one of these rules, as they are for the safety of competitors, staff and spectators alike. **Be sure to remember your weapon lockouts and power-cutting devices!**

We're also working on a small 40x48x~36" test arena to allow you to safely test your weapons. We can't promise this will be completed in time for Fight Night, but we'll do our best to get it done so teams don't have to use the arena to test their weapons. It will be outside, near the pits.

There is lots of parking available near the event, much of it is street parking. Attached (in email) is a map of some parking suggestions that should be helpful! **Buckeye street will be closed for the entirety of the day.** You may be able to use the barricades on Buckeye at Jackson Street as a loading zone, but we recommend you plan on walking with all of your things from your parked vehicle(s).

Beer will be available for sale (in a 21+ area) from Tin Man Kokomo Brewery, and cocktails from the Coterie. Food trucks at the event will include Rabble Rousers, The Local, Prodigy Burger and Oscars Pizza.Tin Man Kokomo Brewery will donate 10% of its proceeds from the event to the Rainbow STEM Alliance whose mission is to promote acceptance and inclusion of LGBTQ+ youth within the Science, Technology, Engineering, Arts and Mathematics educational fields.

This is a rain or shine event. Our rain date location will be in the furthest-east section of the AndyMark world headquarters, located at 1900 E North Street, Kokomo, IN.

Looking forward to seeing everyone on July 20!