

# Plastic Antweight (1 lb) Competition Rules

## SECTION 1: Robot Construction and Functionality

1. **Construction:**
  - a. The chassis, weapon, and lid of the robot must be 3D printed using approved materials - see next section for specifics.
  - b. Machined or cut parts from a block or sheet of plastic material are NOT allowed.
  
2. **Materials:** Plastic Class means that the construction materials must be 3D printed plastic as described below:
  - a. PET, PETG, ABS, PLA, Tough PLA, or PLA+ are the only materials that can be used for the chassis, lid, and weapons. No other types of filament are allowed (Super PLA Plus, TPU, Carbon Fiber, etc).
  - b. **Kit Bots** - Ideally all robots are designed and built by students. However, kit bots are allowed in the competition. We do find that sometimes a kit bot seller will print with non approved materials. The recommendation for using a kit bot is for the competitor to print it themselves to verify approved filament.
  - c. Motors, wheels, electronics, axles, fasteners and adhesives can be any material, but cannot be used in such a way to enhance the structural integrity, armor the robot, or enhance any weapon. See appendix for examples of rule violations
  - d. Tape and zip ties may be used internally (wire management for example) but may not be used to enhance structure of the weapon or chassis.
  - e. Event Directors make final decisions on gray areas and have the right to reinspect any robot at any time during the tournament.
  
2. **Weight:** Robots must be equal to or less than the following weights:
  - a. 1.00 pounds
  - b. 16.00 ounces
  - c. 453.59 grams
  
3. **Safety:**
  - a. All Robots must have a light easily visible from the outside of the robot that shows its main power is activated.
  - b. Name of the robot is clearly visible on the bot - engraved or embossed is preferred.
  - c. All robots must be able to be FULLY deactivated, which includes power to drive and weaponry, in under 60 seconds by a manual disconnect
  - d. On Match Day, robots will pass inspection (weight, materials, failsafe).
  
4. **Radio System:**
  - a. All robots must be radio controlled with 2.4 GHz spread spectrum radio. No tethered robots allowed.

- b. If a robot has a weapon, then all robot systems (drive and weapon) must come to a stop when the transmitter loses power or loses signal.
- 5. **Batteries:** Examples of batteries that are permitted: NiCads, NiMh, LiIon, LiFe, LiPoly.
- 6. **Weapons part 1:** All robots are strongly encouraged to have active weapons. Wedge-only style robots are discouraged.
- 7. **Weapons part 2:** While a variety of spinning weapons are encouraged, there are some weapon systems that are not allowed:
  - a. RF jamming
  - b. EMF fields that affect another robot's electronics
  - c. Entangling weapons (nets, tapes, strings, or other materials that entangle).
  - d. Liquids, foams, gasses, powders, sand etc
  - e. Untethered projectiles
  - f. Fire, combustibles
  - g. Light and smoke that impair the viewing of a robot
  - h. Not allowed to physically engulf your opponent

## **Section 2: Match Rules and Scoring**

### **1. Match Rules:**

- a. Matches last 2 minutes
- b. Trap door opens at one minute
- c. A robot may restrict movement of the opposing bot for a maximum of FIVE seconds before changing positions (ie. pinning, supporting, lifting)
- d. If a robot becomes stuck due to the construction of the arena, not as a result of the opposing bot, the match will be stopped and the robot will be freed.
  - i. A robot may be unstuck a maximum of ONE time per match
- e. There are two ways to win:
  - i. #1 - Knock-out or one robot is disabled. If one of the robots falls or is pushed in the trap door, it counts as a knock-out.
  - ii. #2 - Judges' decision. If a match goes the entire allotted time without one robot getting knocked out, the winner is determined by the judges based on the match score sheet.

### **2. Match Scoring:**

- a. Matches will be scored by a panel of judges (2-3) using the following criteria:
  - i. Control
  - ii. Damage
  - iii. Aggression

### Section 3: Inspection and Documentation

#### 1. Inspection:

- a. All bots must pass inspection to be eligible for the competition. In order to pass, bots must meet the following criteria:
  - i. Pass a fail safe procedure test as laid out in Section 1 (All functions must stop operating when power to the radio is switched off. This includes both weapon and drive operations)
  - ii. Meet weight requirements laid out in Section 1
  - iii. Have a light visible on the outside of the robot
  - iv. Be constructed in a manner consistent with guidelines laid out in Section 1

#### Example 1:

In this example, the weapon motor is mounted outside of the robot. The motor is considered armor. This is NOT ALLOWED.



#### Example 2:

Although the fasteners might be holding the weapon together, they serve as a weapon in this case. This is NOT ALLOWED.



2. **Documentation:** Although not required to compete, we are asking for some kind of documentation to attest to the following:
  - a. Robot is student designed
  - b. If a kit is purchased the documentation shows how the student modified the design.
  - c. Attests to approved materials being used in print the robot

Updated 9/26/24

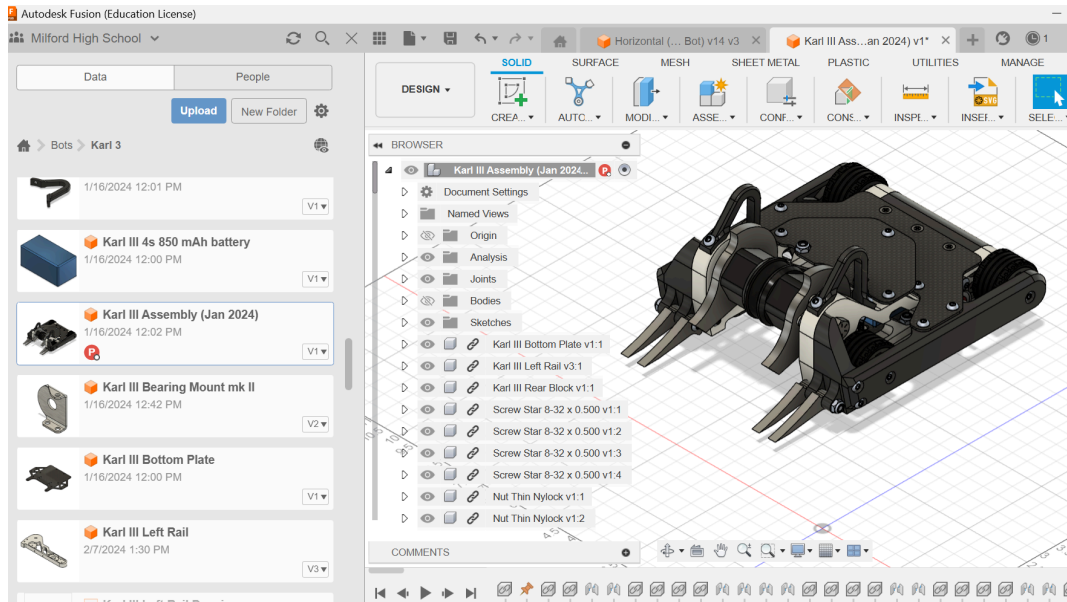
## EXAMPLE MINIMUM DOCUMENTATION

Name of Robot: **Cool Robot**

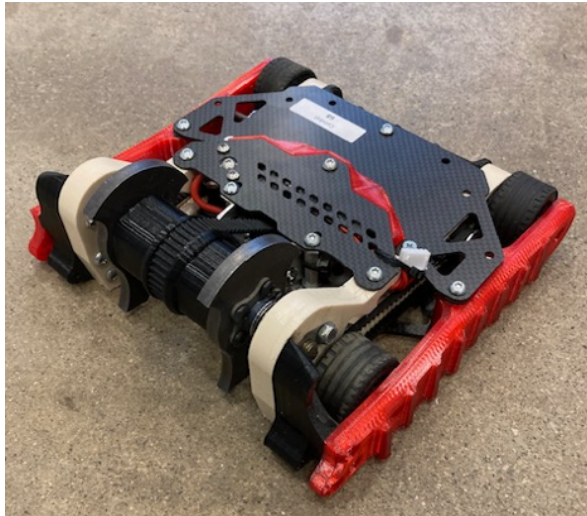
School: **Anyschool**

Name of Team Members: **Student Name**

**3D Model** - shows the model in the context of the modeling software. We can see that the student is designing and assembling the bot.



**Photo of the Printed and Assembled Bot** (this is actually a picture of a 3 lb robot, but you get the idea)



Filament Used to 3D Print: **PLA +**

# Plastic Class Inspection Sheet

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Robot Name: \_\_\_\_\_

Robot Builders or Team Name: \_\_\_\_\_

School Name: \_\_\_\_\_

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**Check the Box if Standard is Met**

- 3D Printed - Chassis, Weapon, Lid with approved filament
  - Appropriate use of other materials (non 3D printed pieces cannot be used as armor)
  - Visible Light (may be internal or external but must be clearly visible)
  - Bot name clearly visible (Embossed or engraved is preferred)
  - Documentation is present
  - Fail-Safe (robot functions, both weapon and drive systems, come to a stop within 60 seconds of the radio being shut off)
  - Weight: \_\_\_\_\_
- 

**Circle One**

PASS

FAIL

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Robot Builder Signature: \_\_\_\_\_

Inspector Signature: \_\_\_\_\_