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** - Robots must be student designed. The only exception is the Fall Dustup. All other events must have a student designed robot. If a kit was purchased, then the documentation should show what was modified.
    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. We will be using a gram scale at events. 454g is the maximum allowed weight.

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, LIon, LiFe, LiPoly.

6. **Weapons part 1:** Robots must have an active weapon. No wedge-only robots are allowed. Weapons can be flipper or some kinds of spinning weapon.

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
8. **Controlled Motion:** Robots must have controlled motion. Typically robots have wheels which are controlled by the operator, but there are other ways to control the motion of the robot such as a shuffler or gyro forces from the weapon. To be eligible to compete, the driver must demonstrate controlled motion during inspection.

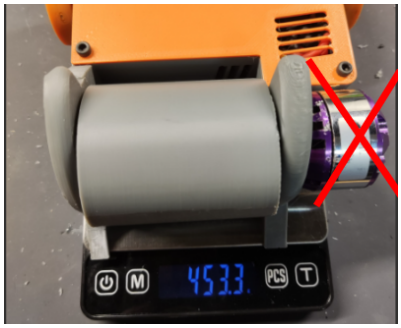
Section 2: Match Rules and Scoring

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

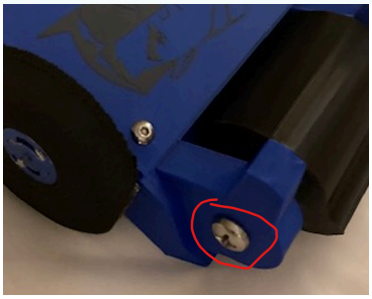
1. **Inspection:**
    a. All bots must pass inspection to be eligible for the competition. In order to pass, bots must meet the following criteria:
        i. Pass a fail safe procedure test as laid out in Section 1 (All functions must stop operating when power to the radio is switched off. This includes 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.

Example 3:
Large bolts must be recessed. In this example, the bolt head will be armor. Some grace will be given in this area but what we are asking is that teams work to avoid a bolt serving as protective armor.
Best practice is to counterbore the bolt head into the chassis of the robot.



2. **Documentation:** Although not required to compete, we are asking for some kind of minimum 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

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.

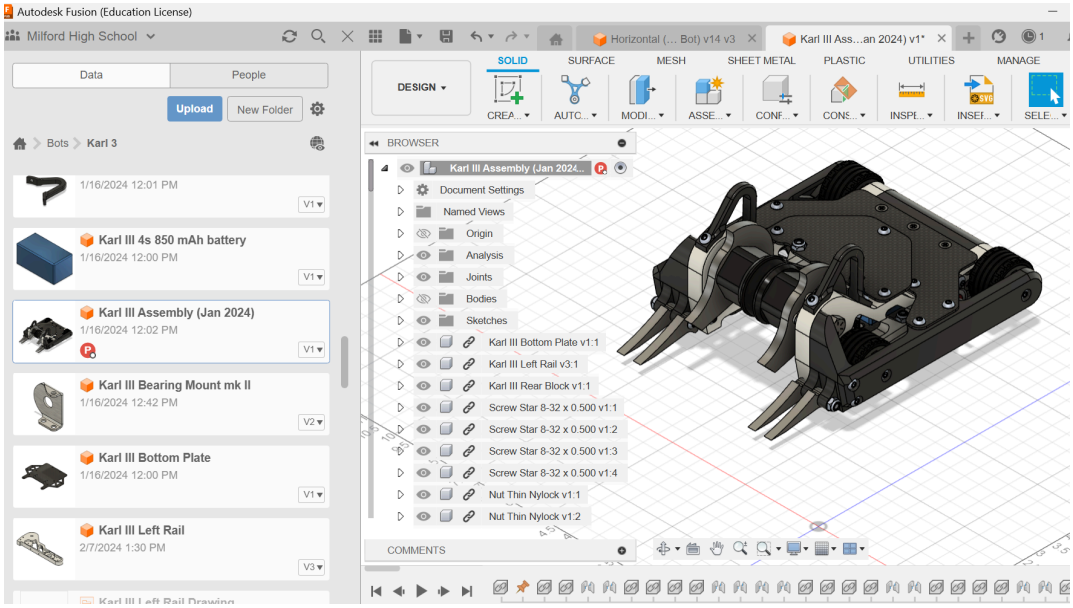
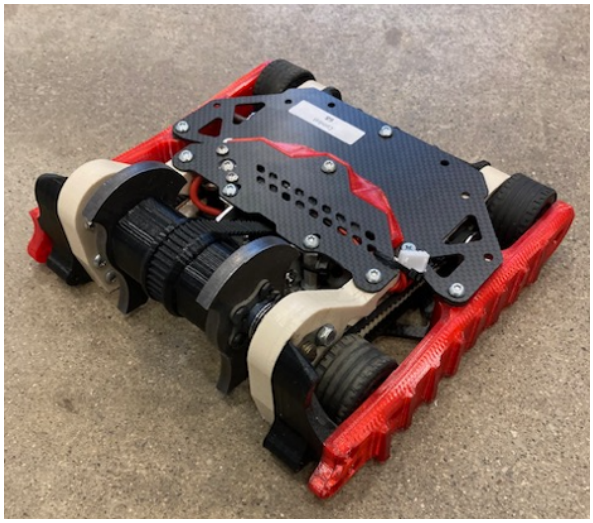


Photo of the Printed and Assembled Bot (this is actually a picture of a 3 lb robot, but you get the idea)



Filament Used to 3D Print: PLA +

Plastic Class Inspection Sheet

Robot Name: _____

Robot Builders or Team Name: _____

School Name: _____

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)**
- ☐ **Controlled motion**
- ☐ **Weight:**_____

Circle One

PASS FAIL

Robot Builder Signature:_____

Inspector Signature:_____