Construction of a Simple Kinetic Sculpture

For the first time, Kinetic Sculptures will race at Worldcon in Seattle. These races will be side by side acceleration contests over five feet. It is not anticipated that there will be room to stage distance contests.

Putting the kinetic in Kinetic Sculpture comes by way of the energy stored in mousetrap springs. Here, construction of an easy to build Kinetic Sculpture is documented. Read all the way through the instructions before imagining a sculpture of your own.

Kits will be available at the con. Kinetic Sculptures built before the con will also be allowed to race. The kits will not include materials for decorating the sculpture and making it more "sculpturier." If you build a kit, bring items to decorate it. There will be a trophy for the best decorated Kinetic Sculpture. Trophies will also be awarded for Top Eliminator and Best Engineered homebuilt.

The kits available as "Mousetrap Car Kits" on the internet will not be suitable for acceleration racing. They also all exceed the maximum length and have variable length, both of which violate the rules of acceleration racing. Nor does any advice you might find on YouTube about distance racing apply. I didn't need a kit or advice to build what you see on these pages.

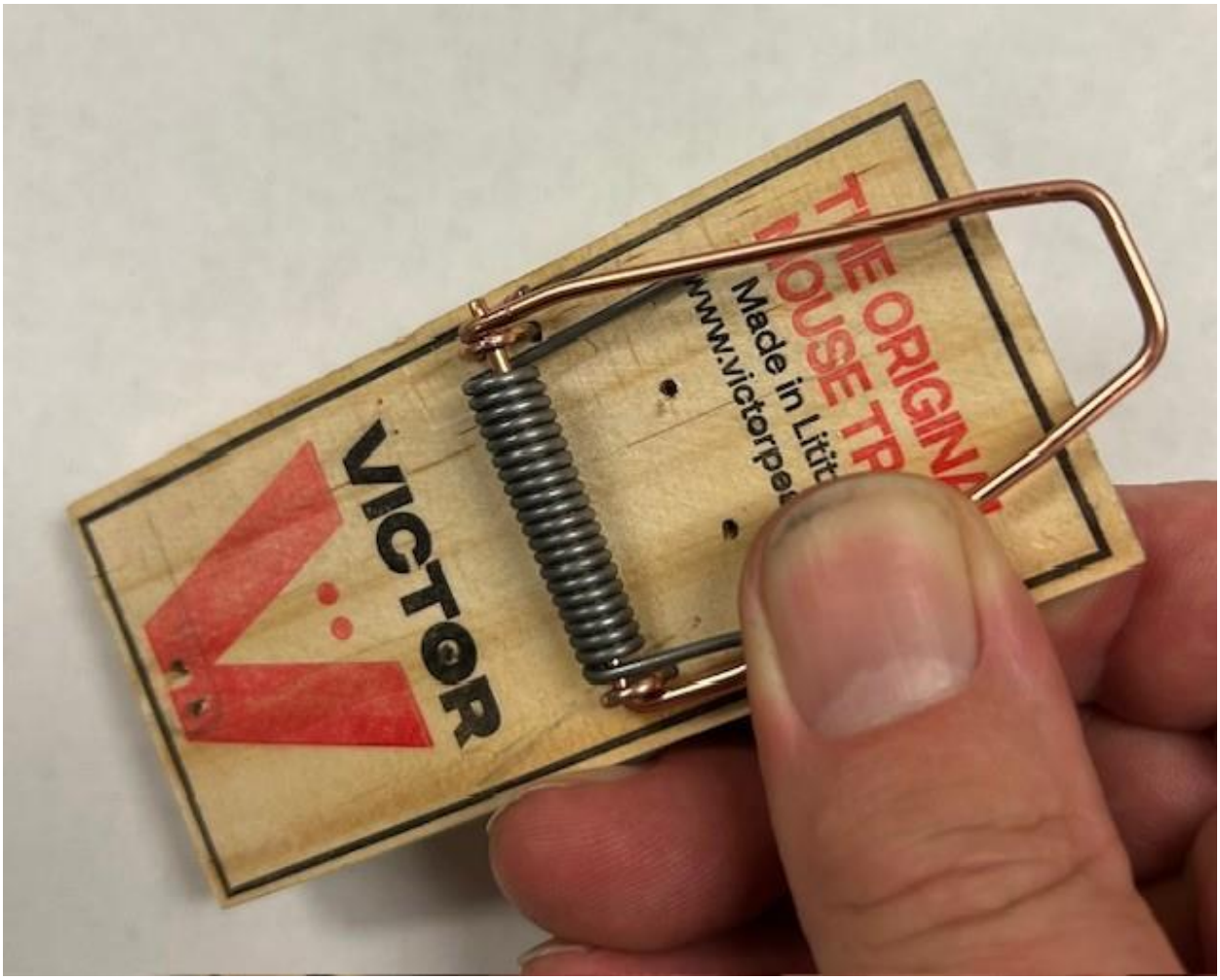
Rules are found at the end. There are Easter Eggs in the rules.

Consider a mousetrap. Victor mousetraps are easy to work with. Any mousetrap is allowed, see rule #3. The unneeded items are stripped from the mousetrap so it looks like the one on the right below.

The arm is easy to remove from the trap.

Bending the arm into a trapezoid has several advantages. It doesn't need to be perfect.

Bending the arm lowers tension in the drive string and makes the arm overhang the base. See below, note the spring is wound up in this photo.

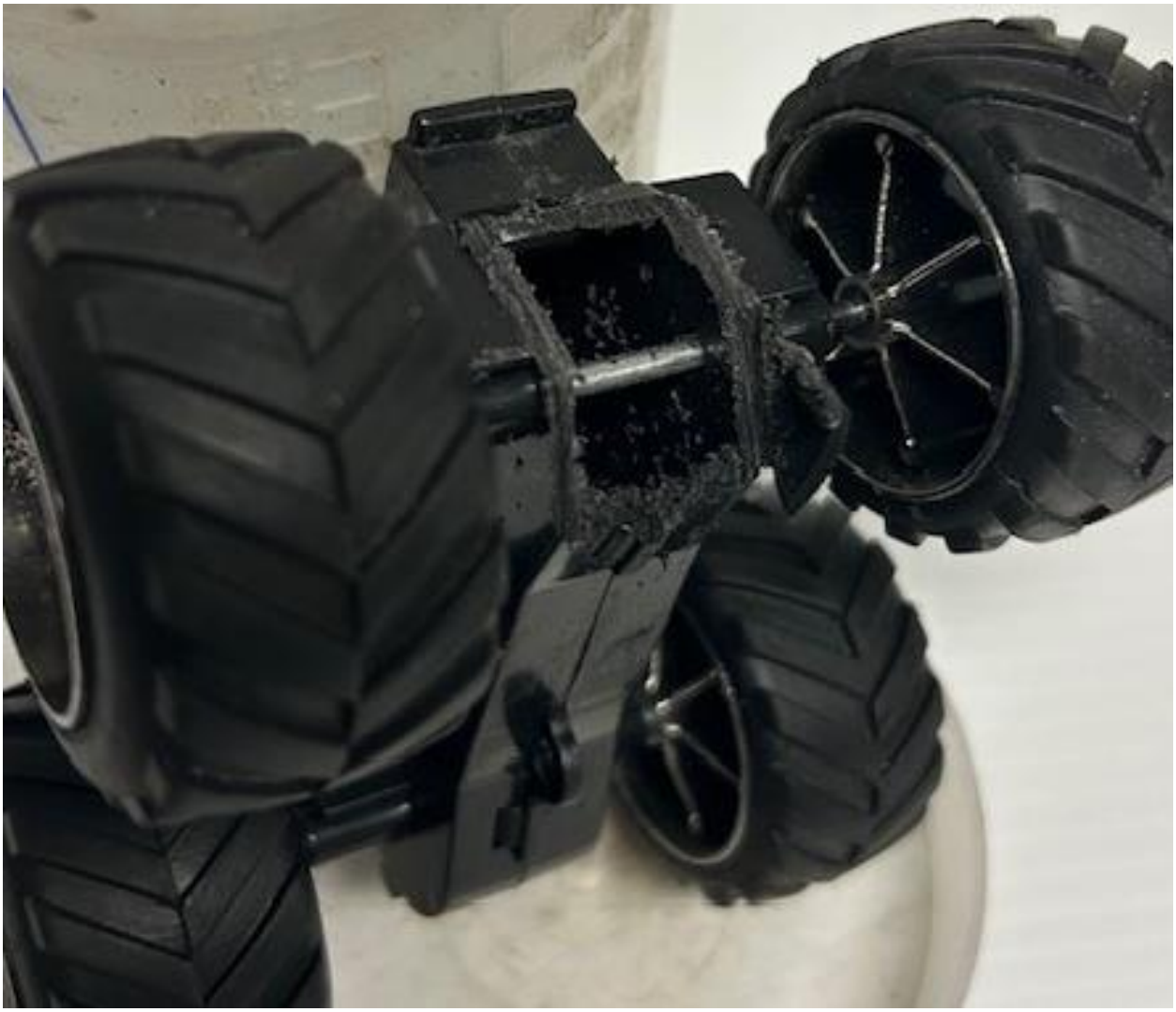


Salvaging a toy vehicle makes creating a Kinetic Sculpture simple. Various toys will work. See the photo.

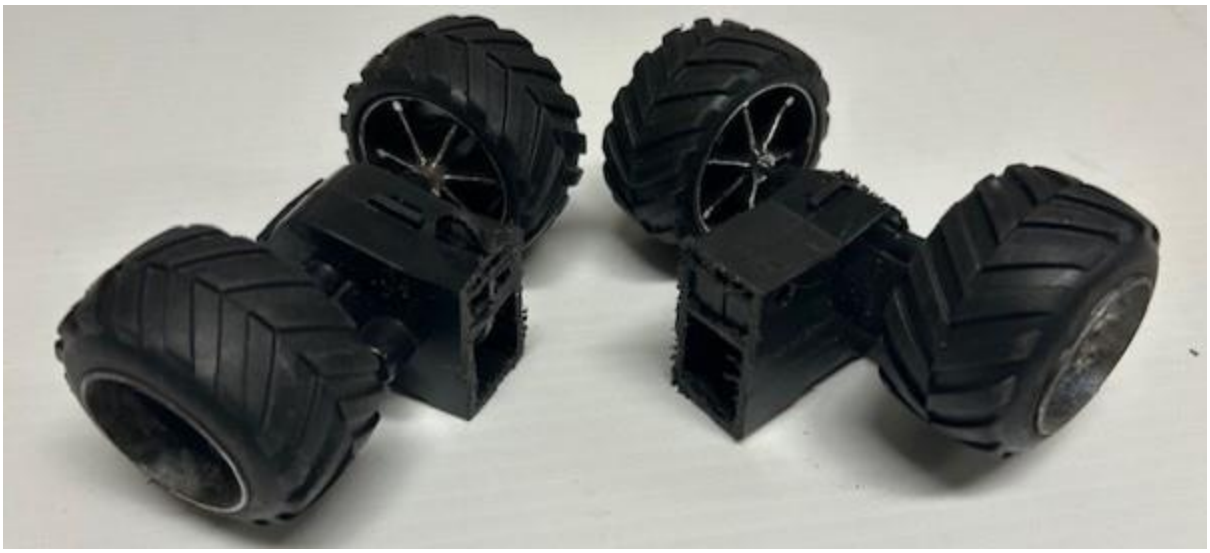
This toy is a good size. The tires are not too big and are spaced apart a handy distance.

Below, see the photo of the disassembled toy. The whole thing was held together with one screw. The screws and the chrome bits might be useful later. Chrome bits can be glued onto this racer so it will be a sculpture. Wish there were more chrome bits!

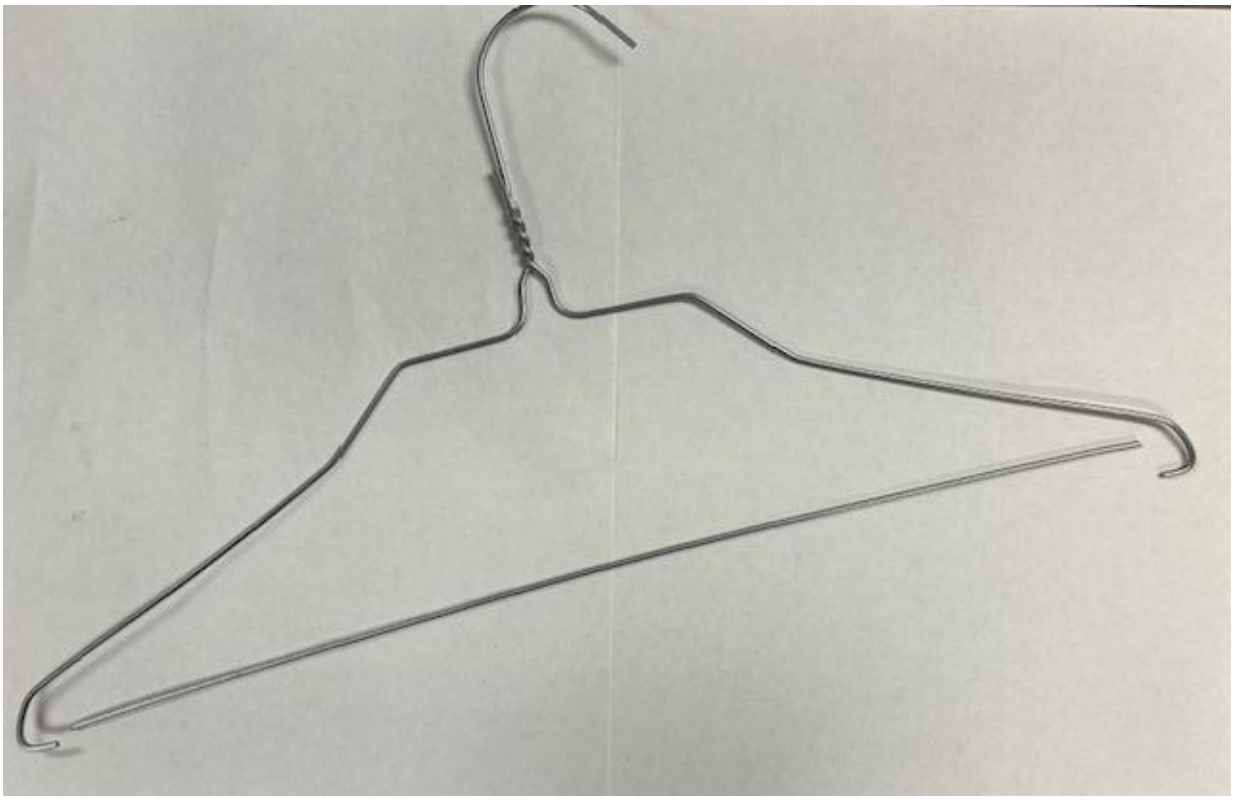
Part of the frame is trimmed away to provide access to the axle, see below. This was the front end of the toy.



The rear wheels are not needed. The front wheels of the toy become the rear wheels of the Kinetic Sculpture.



The steering wheels are mounted on a wire extension. Any wire about the same size as a wire coat hanger will do.



The wire is bent to make a loop in the middle. To make sure the hole is not too small, the wire is wrapped around a screw that's bigger than the one that will attach the steering

wheel assembly. These wheels can be smaller, from another toy in this case. Unfortunately, no chrome parts on this toy.

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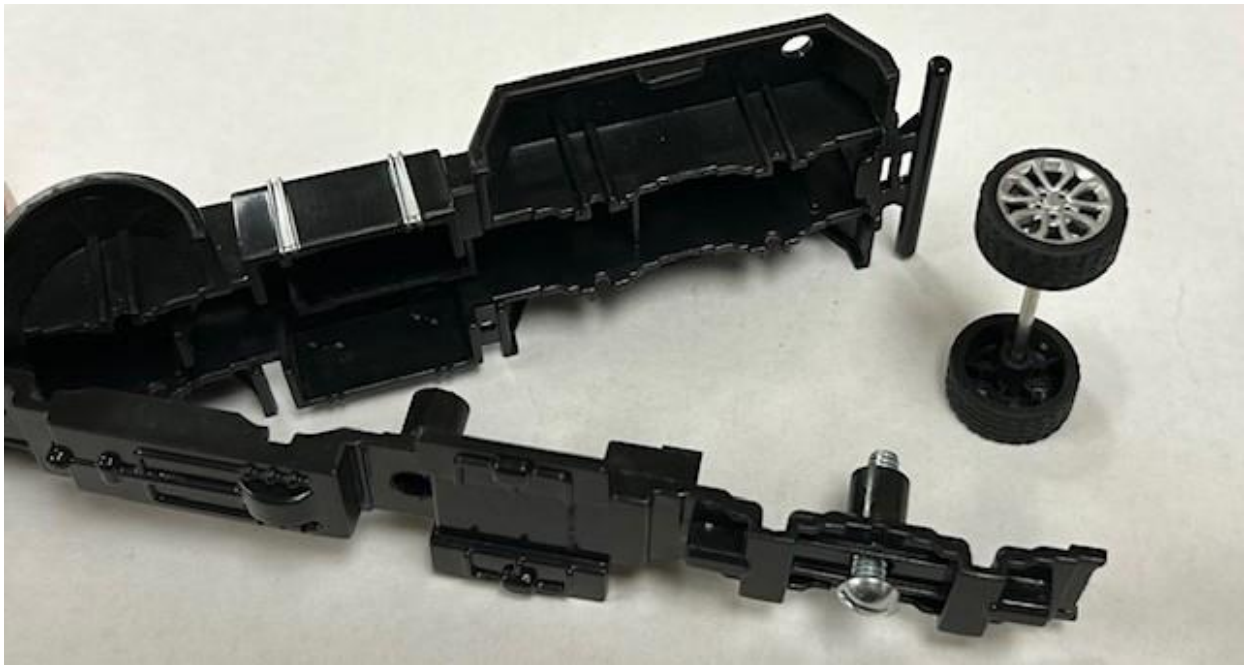
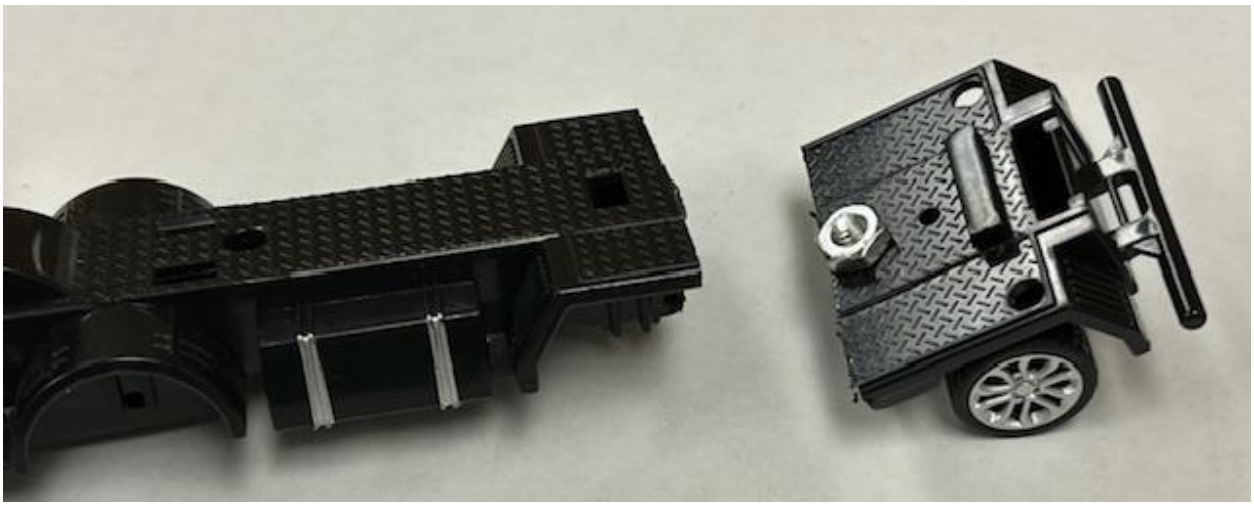
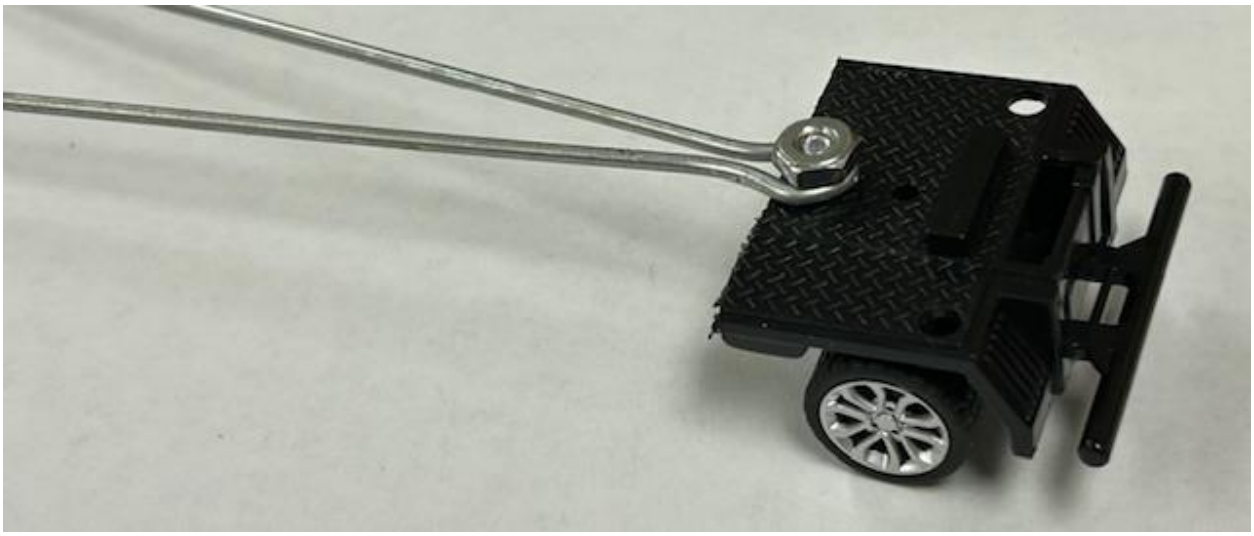
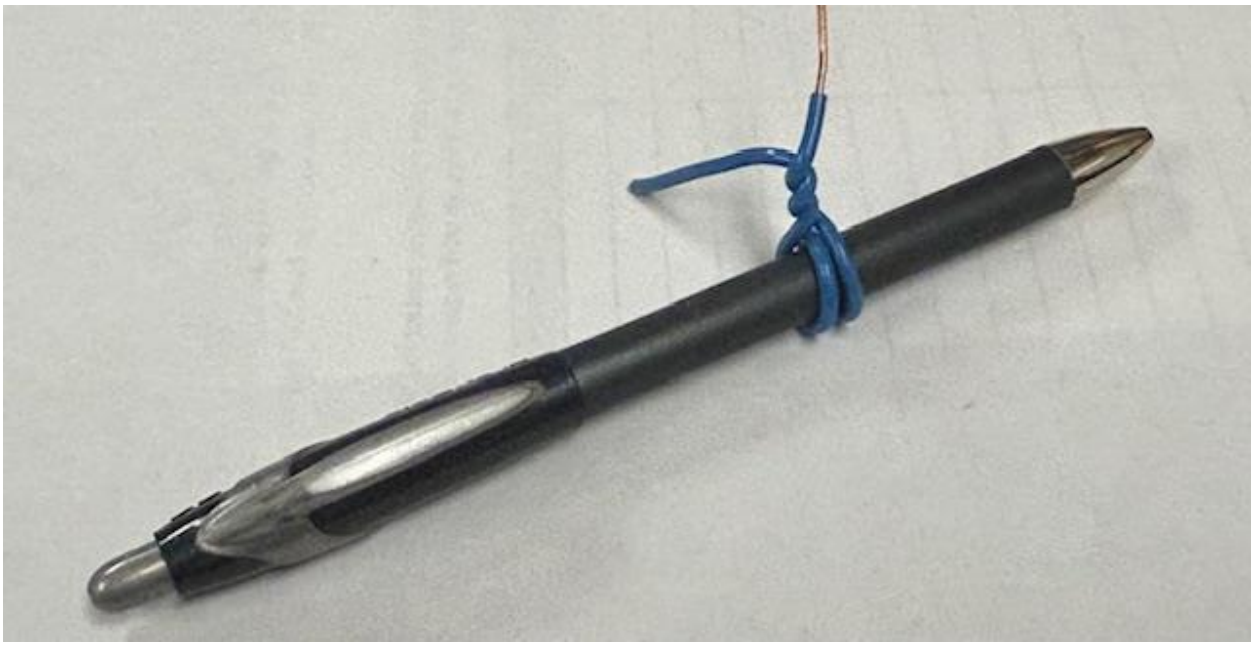


Here one of the tiny screw holes is enlarged for an 8-32 machine screw. A 6-32 machine screw would work as well. The advantage of this design is that the sculpture can be adjusted to travel in a straight line.

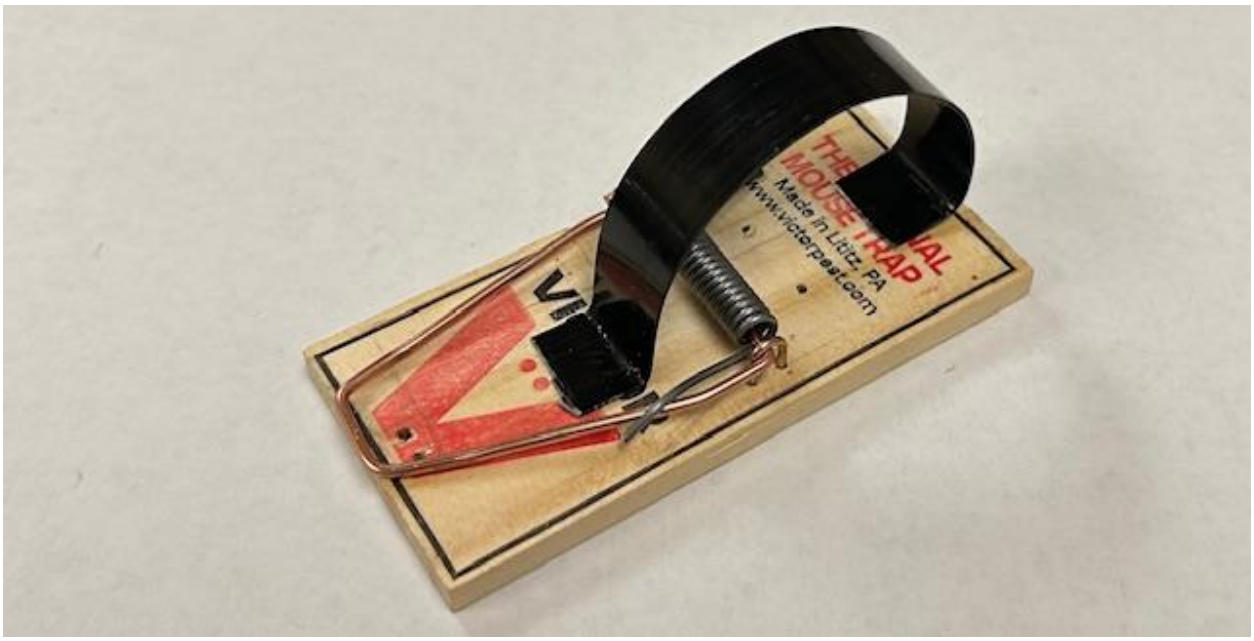




To make a hook for the string, the rear axle is wrapped with 22-26 gage non-insulated wire, preferably copper. Care must be taken twisting the ends to avoid breaking the wire. A fingernail clipper trims the ends. Sharp wire ends may be smoothed with a fingernail file. If the hook slips on the axle, the hook can be glued to the axle. In this photo, the insulated wire represents the copper wire and the pen represents the axle.

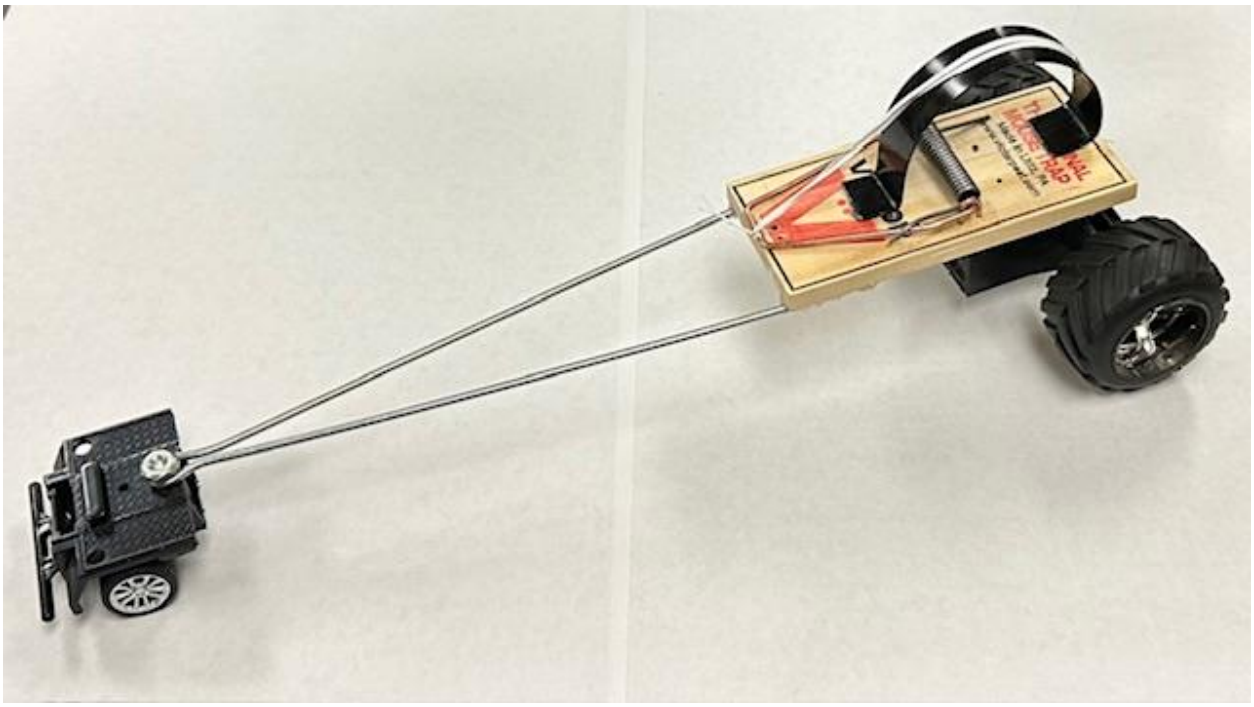


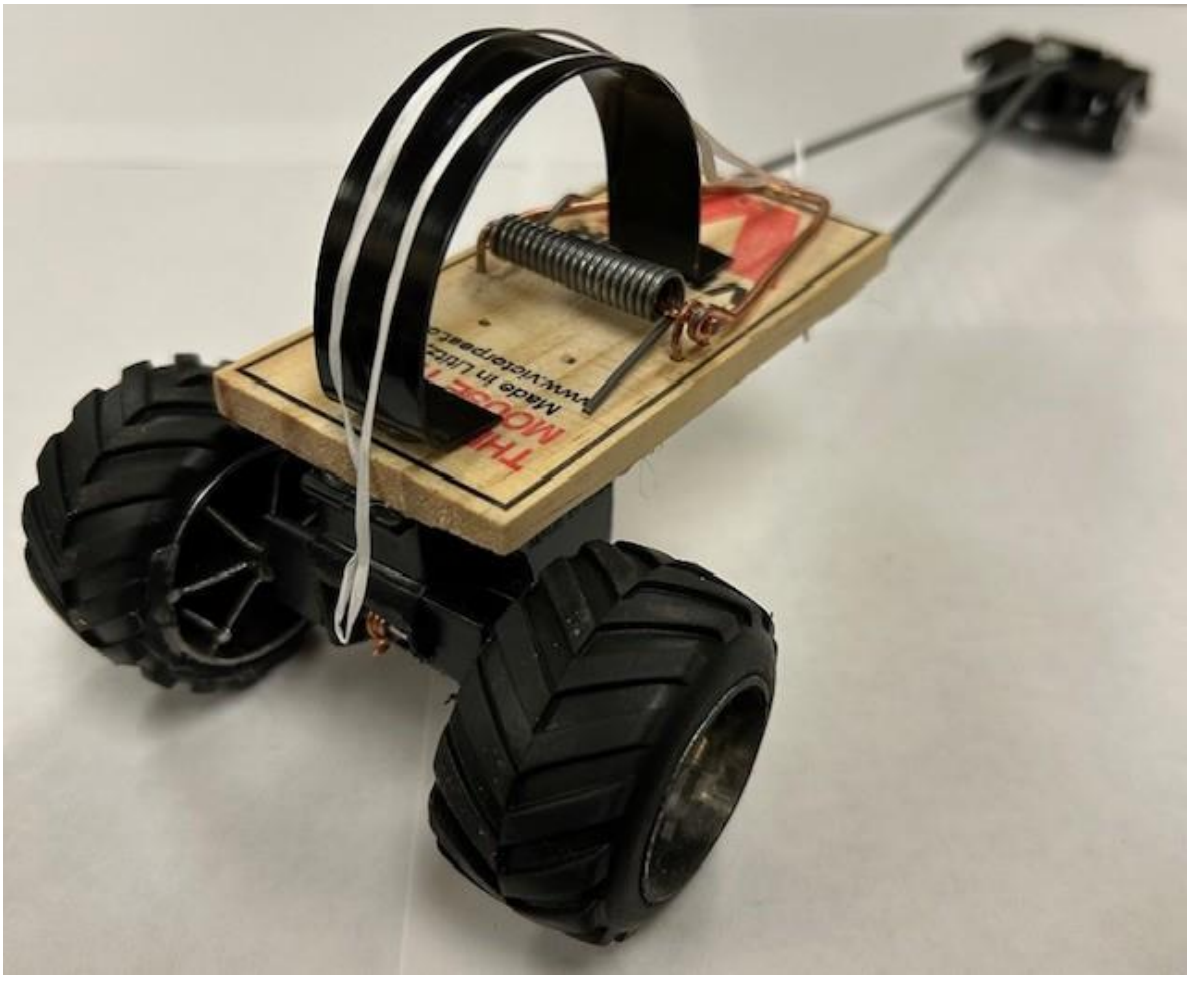
A track for the string to ride on is not required but helps extract more energy from the spring. This is a piece of banding 5/8 by 6 inches. Flashing is easier to bend and is probably strong enough. The flanges are ½ inches. This one is glued down but screws would be stronger. Careful placement is required so the arm doesn't rub on the track.



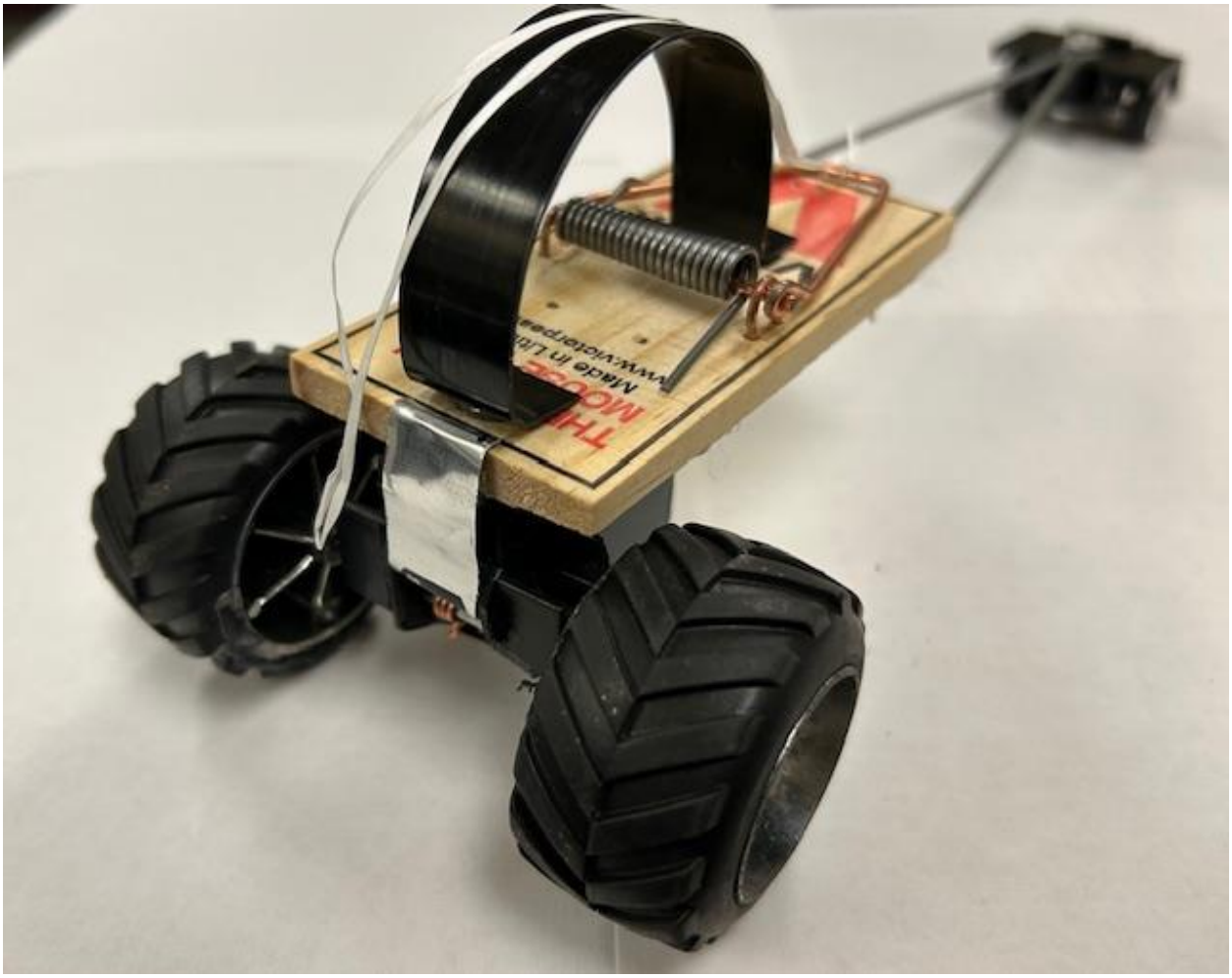
String connects the arm to the axle to transfer energy. Dental floss, especially the kind that looks like a miniature ribbon, works well for this. It's recommended to use a loop. The loop is tied with an overhand knot and then the string is secured to the arm with a wrapped loop as shown. For clarity, a red insulated wire takes the place of the string in this photo. Extra strings will come in handy when a replacement is needed on short notice.

Glue the parts together. The tires on this toy were on the verge of falling off so they were treated to some glue, see the tire on the far side in this photo.

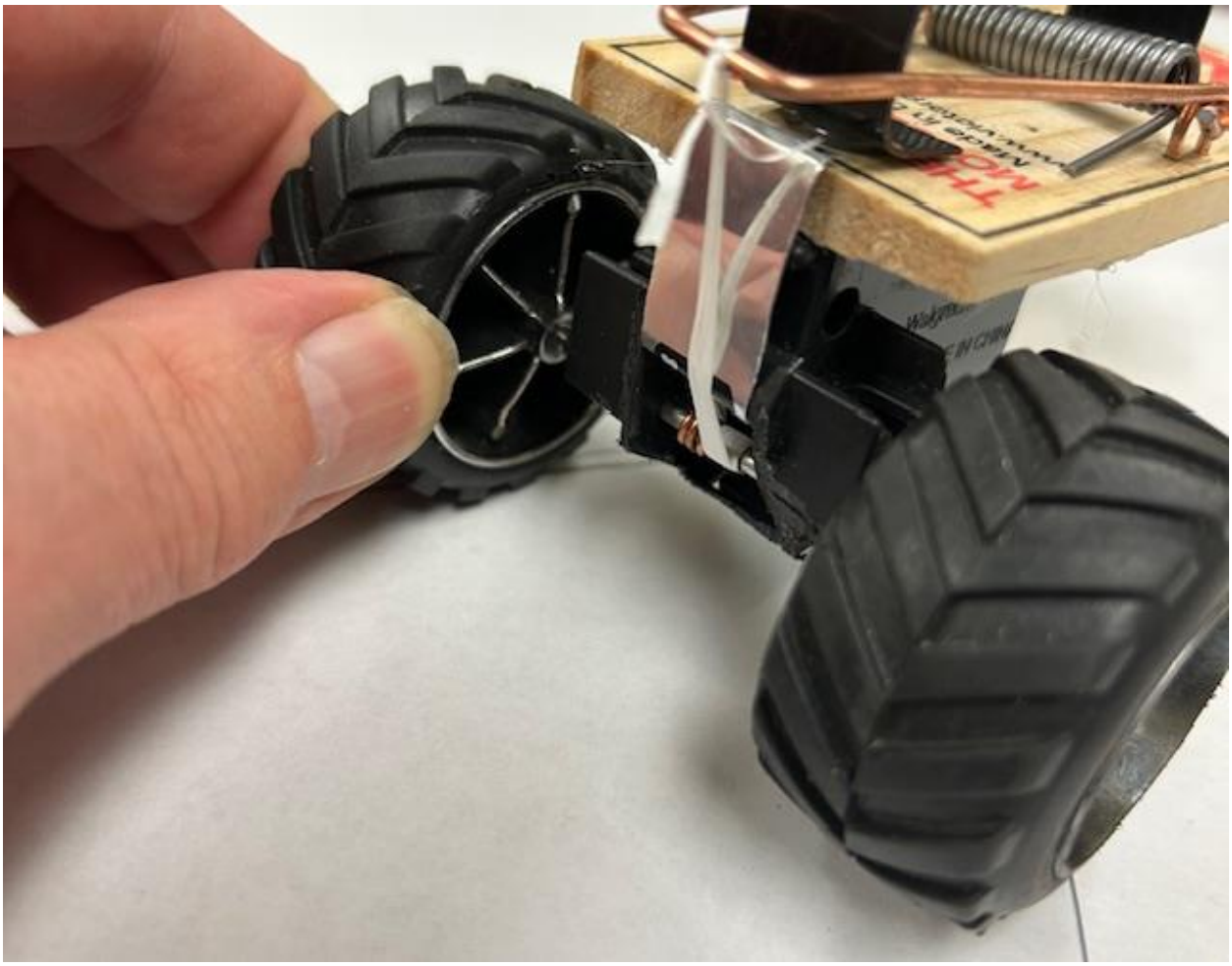




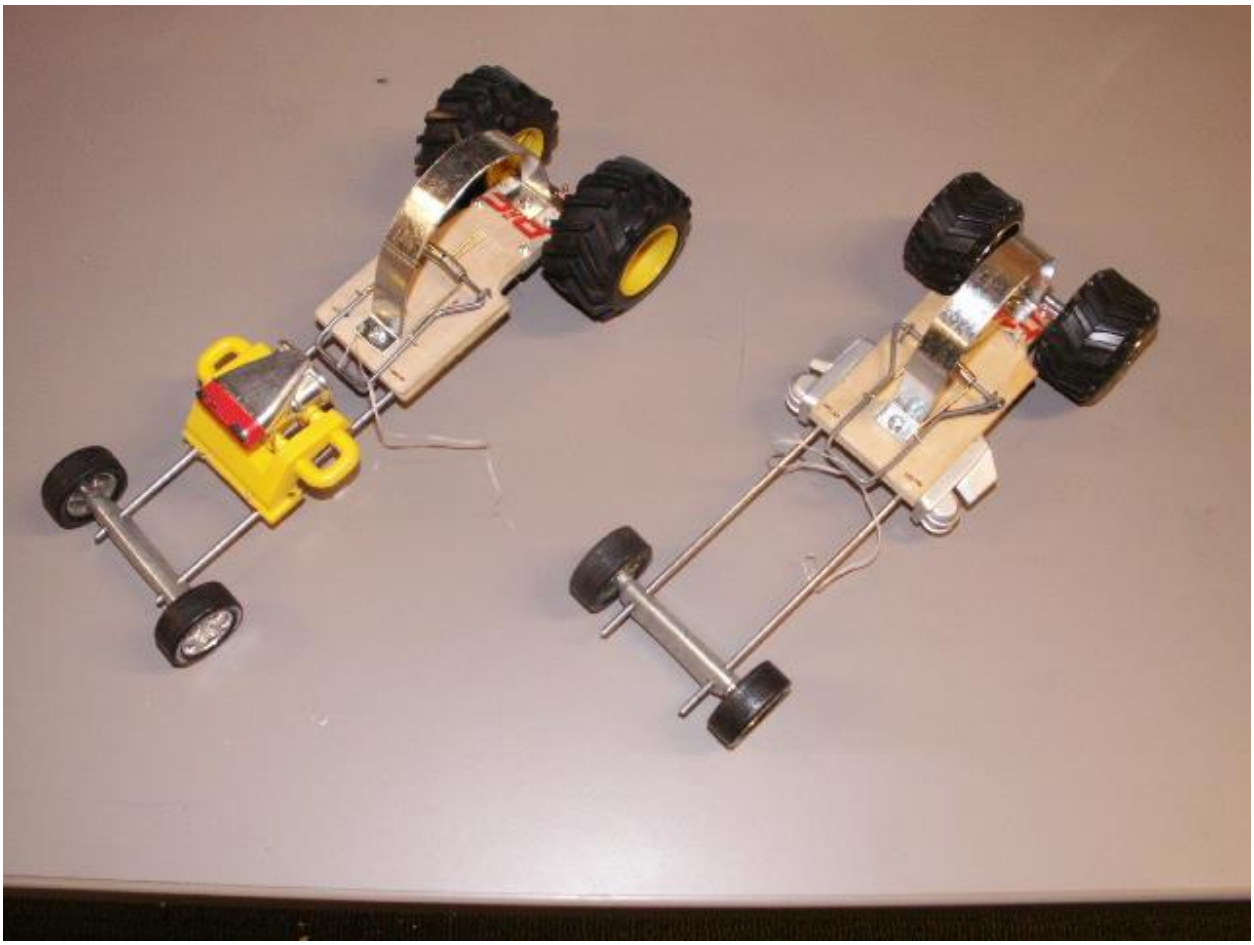
The string might drag over the wood of the mousetrap and rough plastic edges, so a shield was made from a piece of soda can.



To operate, the string is engaged on the hook and the axle is rotated backwards, winding the spring. See photo below. When the spring is fully wound, the Kinetic Sculpture is placed in a suitable area and released. It should go at least ten feet. Pets might want to play with the Kinetic Sculpture, this should not be allowed.



Here are a couple of Kinetic Sculptures that have been decorated with Gratuitous Plastic Do Dads (GPDD).



Here are three more designs to consider. Kinetic Sculptures with match drilled frame rails may not roll in a straight line if they are not carefully crafted. The longest one in this photo is fast and rolls straight, being long helps. Remember the maximum length is 25 cm. The shortest racer spun its tires and didn't roll straight. Large tires with small axles don't have problems with tires spinning. Most successful racers have a tire diameter to axle diameter ratio of 8 to 12. Therefore, a tire 36 mm in diameter should have an axle between 4.5 and 3.0 mm.

Hope to see you and your homebuilt Kinetic Sculpture at Worldcon in Seattle!

Rules for Kinetic Sculpture Construction Revision 1.0

1) The Race Marshall will have sole authority to render binding interpretation of the rules.
2) The driver/sculpture pair is the entry.
 A) Neither driver nor sculpture may be substituted during the race.
 B) A driver may enter multiple sculptures.
 C) A sculpture may not be entered multiple times with different drivers.
 D) The entry will receive an alpha and/or numeric designation which must be affixed to the sculpture.
 E) Sculptures may be built before race day as long as they comply with these rules.
 F) The driver need not have built the sculpture they enter in this race.
3) These sculptures will be propelled solely by energy stored in mousetrap springs.
4) Spring energy must be transmitted to the track through a tire or tires alone.
 A) Any number of tires is allowed but all tires must be mounted on the sculpture.

B) The sculpture and especially the tires must not leave a deposit or residue on the track.
C) Only the tires can touch the track.
D) Tires may be rubber, plastic, wood or metal.
E) Subject to rules 4-B thru 4-D traction materials must be part of the tire.

5) Dimensions and design.
A) The length may not exceed 25 centimeters.
B) The width may not exceed 18 centimeters.
C) The sculpture may not be taller than 18 centimeters.
D) The length and width must be fixed.
E) Ball bearings are prohibited.