



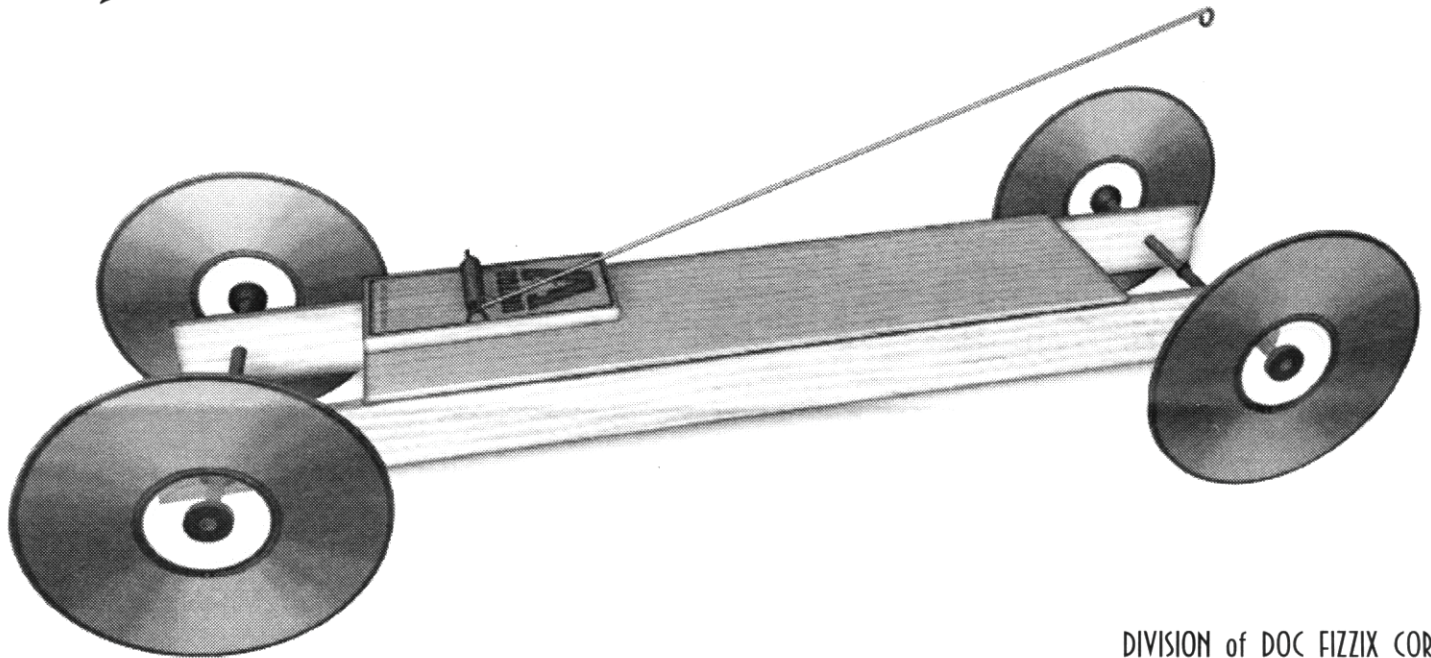
Doc Fizzix Presents

Kit # K-100-DF

THE BASIC KIT - MOUSETRAP POWERED RACER!

ASSEMBLY and OPERATING INSTRUCTIONS

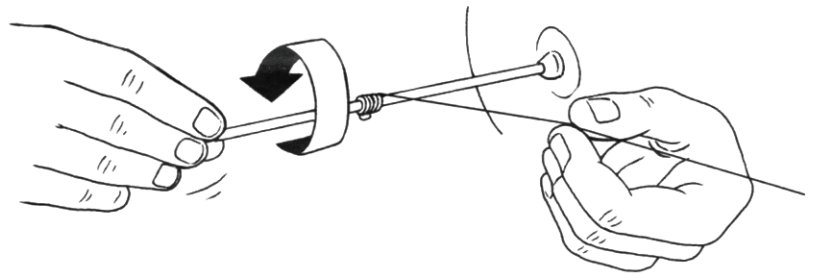
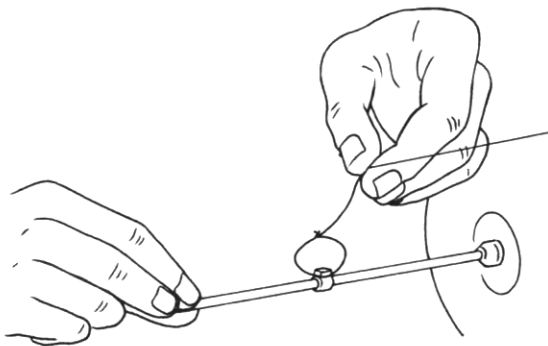
Made in the USA



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WHAT IS A MOUSETRAP POWERED CAR AND HOW DOES IT WORK?

A mousetrap-powered racer is a vehicle that is powered by the energy of a wound up mousetrap's spring. The most basic design is as follows: one end of a string is tied to the tip of a lever arm that is attached to the mousetrap's "snapper" arm. The other end of the string has a loop that is designed to "catch" a hook attached to a drive axle. Once the loop is placed over the axle hook, the string is wound around the drive axle by turning the wheels in the opposite direction to the vehicle intended motion. As the string is wound around the axle by the turning of the wheels, the snapper's lever arm is pulled closer to the drive axle causing the mousetrap's spring to "wind-up" and store energy. When the drive wheels are released, the string is pulled off the drive axle by the mousetrap causing the wheels to rotate.



IDENTIFY AND CHECK OFF THE FOLLOWING PARTS FROM THE LIST BELOW

- 2 - Pre-Drilled Balsa wood Side Rails (18" x 1 1/2")
- 1 - Balsa Wood Deck Top (12" x 3")
- 2 - Brass Axles (4" x 3/16" Tube)
- 1 - Brass Lever Arm (12" x 1/8" Tube)
- 4 - DVD Wheels

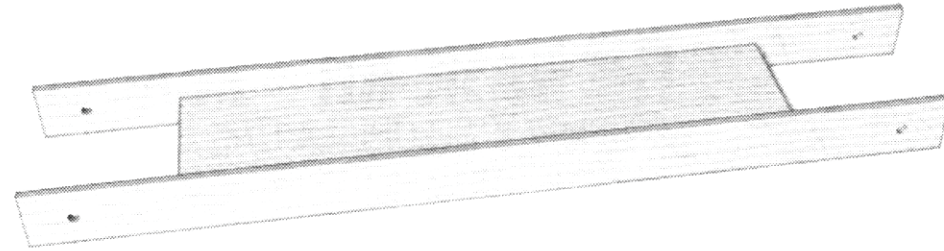
- 4 - Rubber DVD/CD spacers
- 4 - Metal Thrust Washers
- 1 - Victor Mousetrap
- 1 - Zip Lock Axle hook
- 36" - Kevlar String



1. MAKING the FRAME

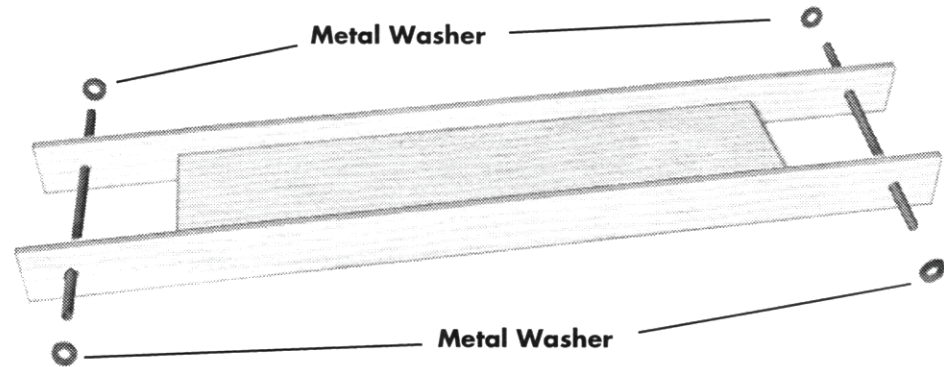
This kit can be assembled in a variety of different ways. Depending on how decided to build your car. Your frame may look slightly different from what is illustrate here.

- A. Center the deck top **between** the two side rails and **GLUE** in place.
- B. Optional performance tip: Lightly sand the frame and the axle holes with 220 then 360 grit sandpaper.



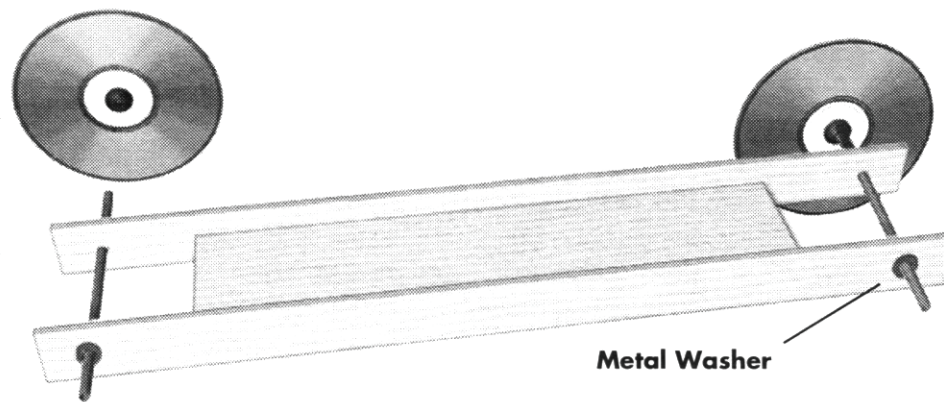
2. MOUNTING the AXLES

- A. Place the 4" brass axles, (3/16" tubing), through the front and rear set of the predrilled axle holes in the frame.
- B. On each side of the axles, place a metal thrust washer. **DO NOT GLUE**



3. ATTACHING the WHEELS

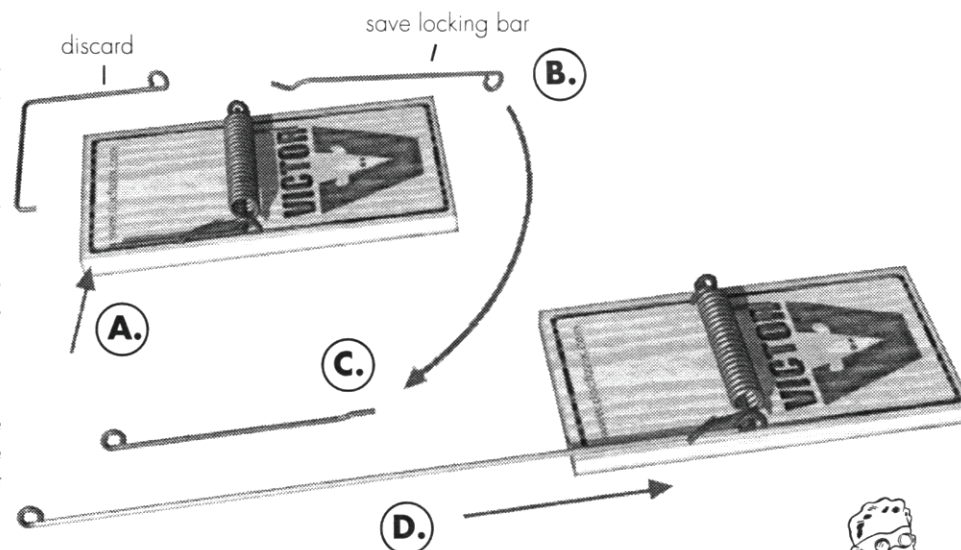
- A. Insert a black rubber DVD/CD spacer into the center hole of each DVD wheel.
- B. Position the wheels even with the end of the axle. Face the pointed side of the spacer towards the frame and pushing on the rubber spacer. **DO NOT GLUE**



IMPORTANT: Axles should spin freely without resistance. There should be side-to-side play between the wheel spacers and the frame. Make sure the wheel spacer are not pushed up against the frame.

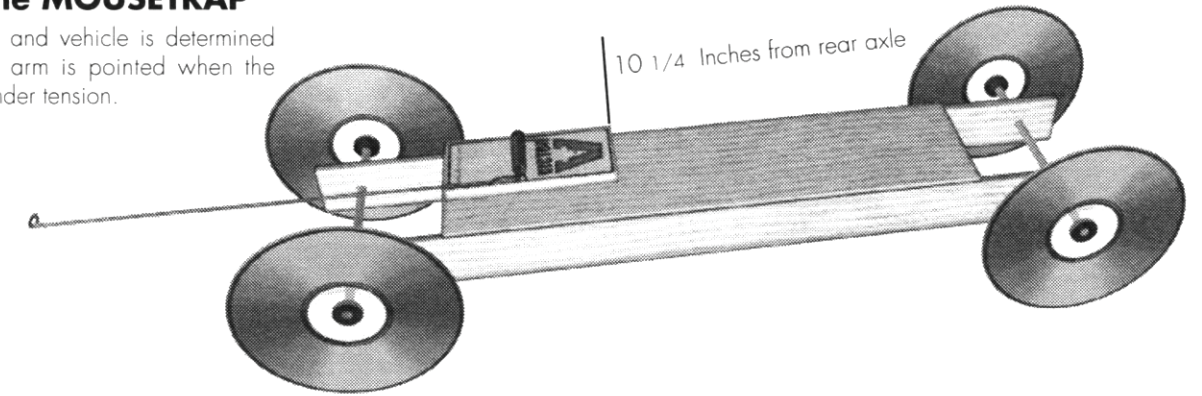
4. ATTACHING the LEVER ARM

- A. Using a pair of needle-nose pliers, or a wire cutter, cut the mousetrap's snapper arm at the corner on the side where the mousetrap's spring is pushing on top of the snapper's arm.
- B. Remove the mousetrap's locking bar and save this part for **step C**.
- C. Using a pair of pliers, straighten the non-loop end of the locking bar and then slide it all the way into one end of the thin 12" x 1/8" inch brass lever arm, **SUPER GLUE** in place.
- D. Slide the other end of the lever arm over the mousetrap's cut snapper arm making sure the tube slides under the mousetrap's spring arm at the base of the snapper, **DO NOT GLUE**.



5. ATTACHING the MOUSETRAP

The front of the mousetrap and vehicle is determined by the direction the lever arm is pointed when the mousetrap's spring is not under tension.

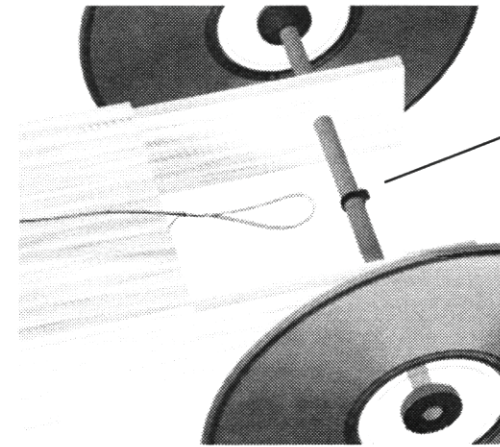
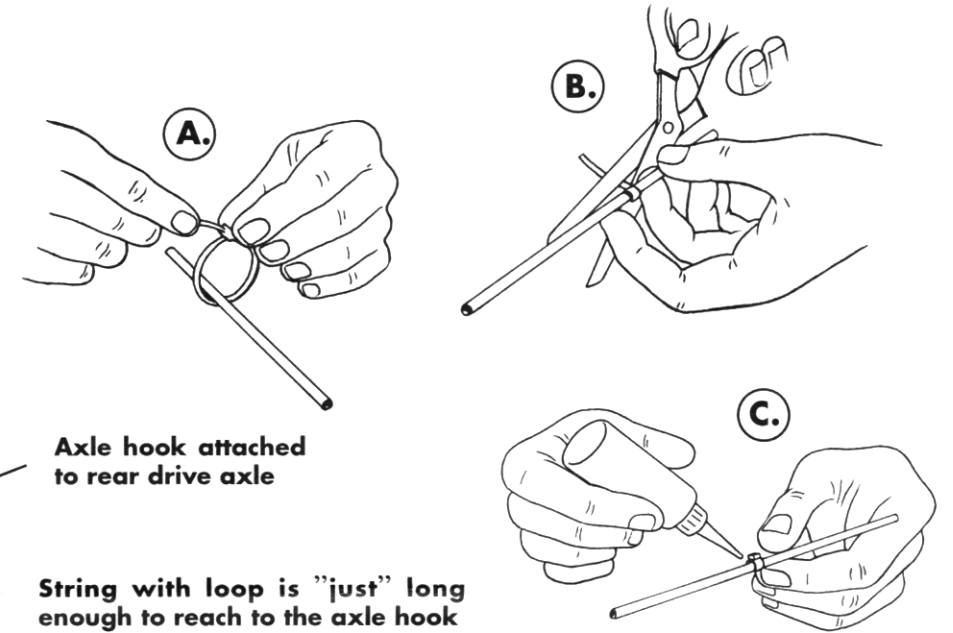


- A. Position the mousetrap against the side of the deck top so that the lever arm runs along the **center axis** of the vehicle. The placement of the mousetrap from the drive axle will determine the performance of the vehicle. For maximum travel distance, glue the back of the mousetrap 10 1/4 inches from the drive axle and do not change the length of the lever arm. For maximum speed, position the mousetrap 2 1/4 inches from the drive axle and cut the lever arm to a length of 4 1/4 inches. The lever arm can be cut using a dremel tool or by using a fine tooth hobby saw. The lever arm should always be "just" long enough to reach the drive axle or performance will be compromised.

The mousetrap can be glued in place or for a less permanent solution, you can attach the mousetrap to the deck top with some small bolts, wood screws are not recommended since they will "tear" the balsa. If you decide to use some small bolts to secure the mousetrap you may have to use a drill in order to makes holes through the mousetrap and the deck top.

6. ATTACHING the AXLE HOOK

- A. Tighten the small zip lock around the center of the drive axle by insert the thin end of the zip tie through the clasp and then pull tight.
- B. Use a pair of scissors or an Exacto knife to trim the excess zip lock flush with the clasp.
- C. Place a couple of drops of **SUPER GLUE** on the zip lock to bond it with the drive axle.

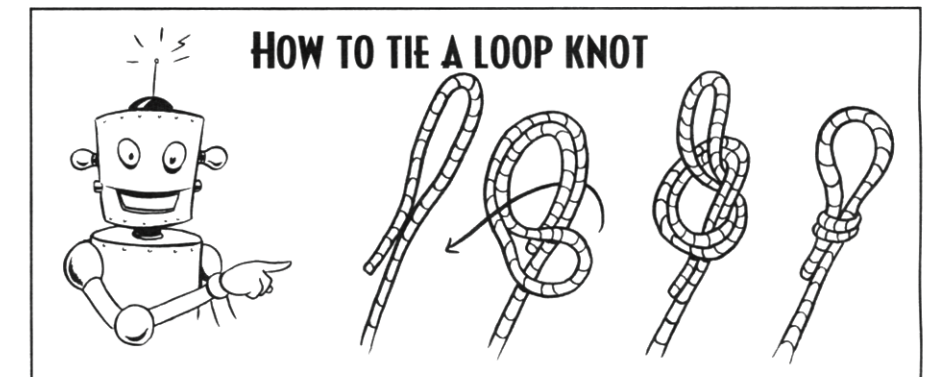


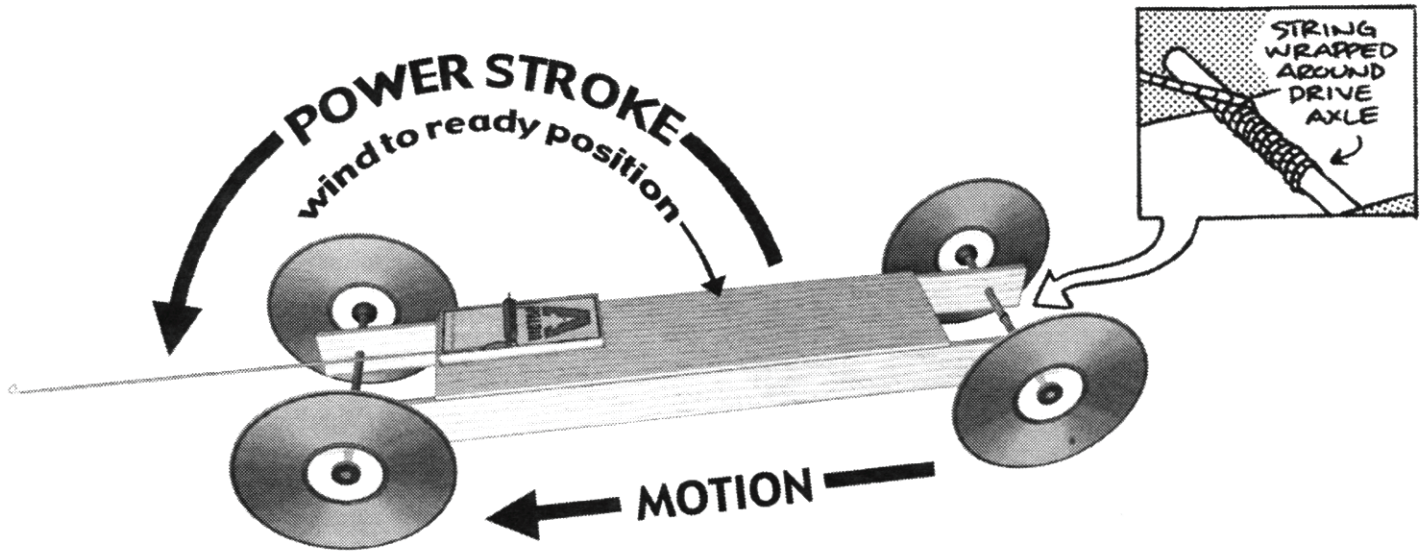
Axle hook attached to rear drive axle

String with loop is "just" long enough to reach to the axle hook

7. ATTACHING the STRING

- A. Tie one end of the string to the locking bar loop sticking out from the tip of the lever arm.
- B. Measured from the tip of the lever arm, the string should be "just" long enough to reach to the drive axle or even a little shorter. Tie a loop knot in the free end of the string so that the loop will "just" reach the axle hook.





8. HOW it WORKS

One end of a string is tied to the tip of a lever arm that is attached to the mousetrap's "snapper" arm. The other end of the string has a loop that is designed to "catch" a hook attached to a drive axle. Once the loop is placed over the axle hook, the string is wound around the drive axle by turning the wheels in the opposite direction to the vehicle intended motion. As the string is wound around the axle by the turning of the wheels, the snapper's lever arm is pulled closer to the drive axle causing the mousetrap's spring to "wind-up" and store energy. When the drive wheels are released, the string is pulled off the drive axle by the mousetrap causing the wheels to rotate.

Top Secret

PERFORMANCE TIPS



There are MANY things that can be done to a mousetrap-powered racer to change the speed and/or distance of traveling. Try to find a harmonious balance between improvements that have a positive effect on the performance of your racer, experimenting and testing is the key to success.

- Do not put slack in the string as it is wound around the drive axle by holding down on the mousetrap. The string should be pulled tightly by the mousetrap's lever as it is wound around the axle.
- The string should be "just" long enough to reach from the tip of the lever arm to the drive axle's hook. If the string is too long it will not fully unwind from the drive axle causing it to tangle around the drive axle then stopping the vehicles motion.
- Graphite powder will reduce the friction on those moving parts where it is applied causing the vehicle to move faster and farther. Use graphite powder between ALL moving parts that touch one another.
- Straighten out the wheels so they do not wobble. Not all the rubber spacers are the same, some holes might be off center, experiment with the rubber spacers by switch them out in order to find which ones work best with the wheels and produce the smoothest ride.
- If you are building a speed-trap racer or a power pull vehicle, position the mousetrap closer to the drive axle and shorten the lever arm. With a vehicle fully wound and in the ready to release position, the lever arm should NOT extend past the drive axle when viewed from above, trim the lever arm so that it "just" reaches to the drive axle.

- If a vehicle is "spinning-out" at the start try the following trick: cut out the middle section of a balloon so that it forms a band that can be stretched around the outer edge of a wheel. Use ONLY on the drive wheels in order to keep the rotation inertia low.
- This is a GREAT race time tip for a vehicle that needs a little extra speed or torque, wrap masking tape around the drive axle, a thicker drive axle will generate more torque and/or speed. Make sure that each wrap of tape goes on smoothly and tightly, you will have to attach a new axle hook over the tape. If your vehicle is "spinning out" after adding the tape, try removing some of the layers of tape.
- Steering can be a big problem and there are several reasons why a vehicle may not travel straight, a courses might be sloped and/or have bumps that throw-off a vehicle's line of travel, a vehicle's axles might not be aligned with one-another causing it to drift towards one direction. Unless your vehicle has adjustable steering there is little that can be done to change the alignment of an assembled vehicle. Learn to play the curve! If a car curves to the right, start the car on the right hand side of the course and aim it towards the left side in order to obtain the largest possible arc of travel. Find out where to start your racer along the start line and in which direction it should be aimed in order to obtain maximum results.

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