Off-Road RC Racing Competition

Official Rules
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Objective:
Before the competition, competitors will design and build an RC off-road racer (using LEGO set #8475, plus any additional LEGO) capable of transferring an object. At the competition each competitor will control their racer using the radio control unit to complete as many laps as possible in the five minute time limit. On each lap the vehicle must pick up a Lego 'barbell' at one location, and drop it off at a second location.

Scoring:
The racer that has traveled furthest will be the winner. This will be determined by how many full and partial laps they have completed, minus any penalties they've accumulated. A full lap is one which results in the successful transfer of a Lego barbell from the numbered pickup location to the numbered drop-off location. The track will be divided into 10 sections. A partial lap will be how many such sections the vehicle is past the starting line. (*1) Penalties are measured in sections as well. See the next section.

Penalties:
Any racer that completely leaves the track will receive a penalty point each time they leave. They must return to the track within the same section that they left it, or receive two additional penalty points for each section of the track that they skipped. When the time limit is done, each penalty point will result in the racer being moved back one section of the track. Additional penalties may be given by the judges for unsportsmanlike conduct.

At the five minute time-limit, a signal will be given by the judges. All racers must come to a full and complete stop immediately. Any racer still moving after the signal will be assigned additional penalty points, or may be disqualified.

Disqualifying:
A racer that attempts to transfer more than a single barbell on any lap will be disqualified. A racer that attempts to damage another racer will also be disqualified.

Pit Stops:
If a vehicle becomes damaged, the competitor may make quick fixes, but the clock will continue running. The vehicle must be returned to the same location it was picked up from. Leaving their radio controller behind, the competitor must carefully walk to the vehicle, not interfering with other

vehicles or damaging the track/obstacles. If a vehicle leaves the track, the preferred method of returning it to the track is to drive it back via radio control. If this isn't possible, or if the vehicle ends up on its side, the competitor may leave their radio controller behind, walk to their vehicle, and place it back on the track. (*2) In both cases, the competitor must carefully walk back to their radio controller before they may operate their vehicle again.

Track Description:
The track will be indoors. Its minimum width will be two feet, its maximum width will be around four feet. The track will have hills, curves, loose gravel (Lego), ruts, and other obstacles. It will be visually divided into ten sections. The edge of the track will be marked with masking tape in places that it isn't otherwise obvious where the edge is. The starting line will be next to the 'drop-off' zones. Half way around the track will be the pick-up zones. Each pick-up and drop-off zone will be a partially enclosed (3 walls) area. Each such zone will have a clearly visible number that corresponds to a channel number. Racers are meant to retrieve and drop off their barbells from the zone corresponding to their channel number.

Barbell Description:
The 'barbell' is a set of technic beams connected as shown in this picture: (http://www.brickshelf.com/gallery/David/Misc/Competition/barbell.gif). There will be a different colour for each racer.

Building Rules:
Only unmodified LEGO pieces, using standard building practices (no gluing, etc.) may be used for the racers. Each racer may use only on a single copy of the transmitter and receiver from the set #8475, "Remote Controlled Race Buggy (27 MHz)" by LEGO Systems, Inc. But any other additional LEGO may be used. This set will need to be modified to accommodate the picking up and dropping off of the barbells using the auxiliary output. Any other modifications are also welcome. Safe and courteous building only: No arcing or electromagnetic interference with other vehicles' radio controls will be permitted.

The maximum width of a racer is 10 inches. (*3)

Competition Order:
Racers will be assigned a starting order, and a 'channel number'. Each race will involve three vehicles. Depending on the number of entries, each racer will have two opportunities to run. The better of the two trials will be considered their standing.

The winner of each individual race will receive a small, token prize. The overall first and second place winners will receive an additional prize.

Notes:
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*1 - Note that the racer needs to successfully transfer the barbell to the drop-off zone for a lap to count. If a barbell isn't completely in the drop-off zone by the end of the time limit, the lap doesn't count as a full lap. In the worst case, if a racer doesn't attempt to transfer any barbells at all, their score will simply be the section number (up to 10) that they end up on, no matter how many times they've driven around the track.

*2 - This might happen, for instance, if the racer manages to go over the sides, fall off a hill (or table), etc.

*3 - Keeping the length short will also help in having a small turning radius.

Building Hints:
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1) Make angled bumpers to help you get into the box to pick up barbells.
2) Consider guards around the wheels.
3) Build a sturdier steering mechanism; if you build exactly what's in the instructions, the car will often loose their front wheels in minor impacts.
4) Consider different mechanisms for picking up the barbell. A shovel-like scoop might work, but chances are it will loose the barbell over rough terrain. A claw might work better.