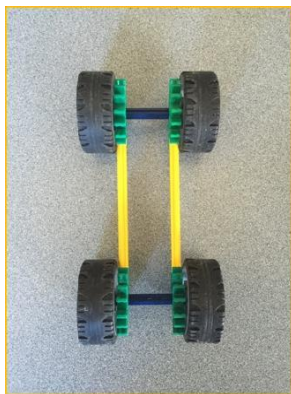


K'Nex Derby Physics Demonstration

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Overview: In this demonstration, you will be building a K'Nex chassis with the goal of sending your car down the track the fastest. To complete this project, you will have access to K'Nex parts, the K'Nex Derby track, and multiple weights that must be included on your car.



Instructions for Building Your Car:

1. Before building your car, think about if you want to put your weights on the front or back rods of the car.
2. Assemble the parts shown in the picture of the car that you chose to construct, or build your own!
3. Put one of the smaller two rods through one of the wheels.
4. Put two connectors onto the rod followed by the second wheel. (*Add your weights before the wheel if you have chosen to put them on the front.*)
5. If necessary, attach the end pieces to keep the wheels from falling off the rods.
6. Attach the longer rod to the connector, length-wise, and put the third and fourth connectors on the end of the length-wise rods.
7. Put the remaining wheels on the end of the rods and cap them with the end pieces (*including your weights if necessary*).

Instructions for Racing Your Car:

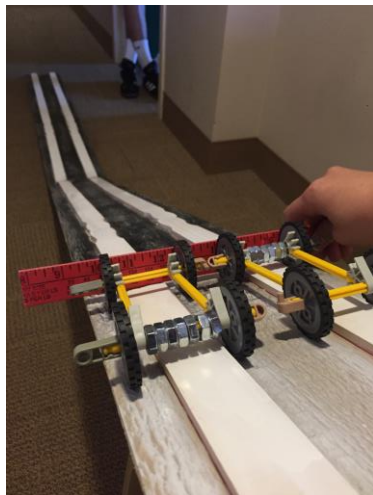
1. After assembling your car and incorporating your weight, you are ready to race!
2. Find a partner to race against.
3. Place the starting rod in the slot and rest the front of both the cars behind the starting line.
4. Once the cars have been set, quickly remove the starting rod by pulling up to send your cars flying down the track.
5. Look closely to see which car finished first.
6. Discuss why you think the winning car may have been faster (*Hint: see "The Physics Behind the Project"*)

The Physics Behind the Project

Weight distribution on a car, or in other words, where you decided to put the weight on the car, greatly affects the speed at which your car goes down the ramp. The reason behind this idea has to do with the effect of gravity on potential energy. When the majority of the weight of the car is placed towards the back, greater potential energy is created at the starting gate, before you let go. This potential energy is converted to kinetic energy, which sends it flying down the track.

Table of Results

Placement of Weights	Time
Front of Car	3.47 sec
Back of Car	2.52 sec



Alternate Projects!

- Test car design's effect on speed by changing wheel size, axel length
- Test the effect of adding more weight to the same location on a car on speed