

The

Pullback Car

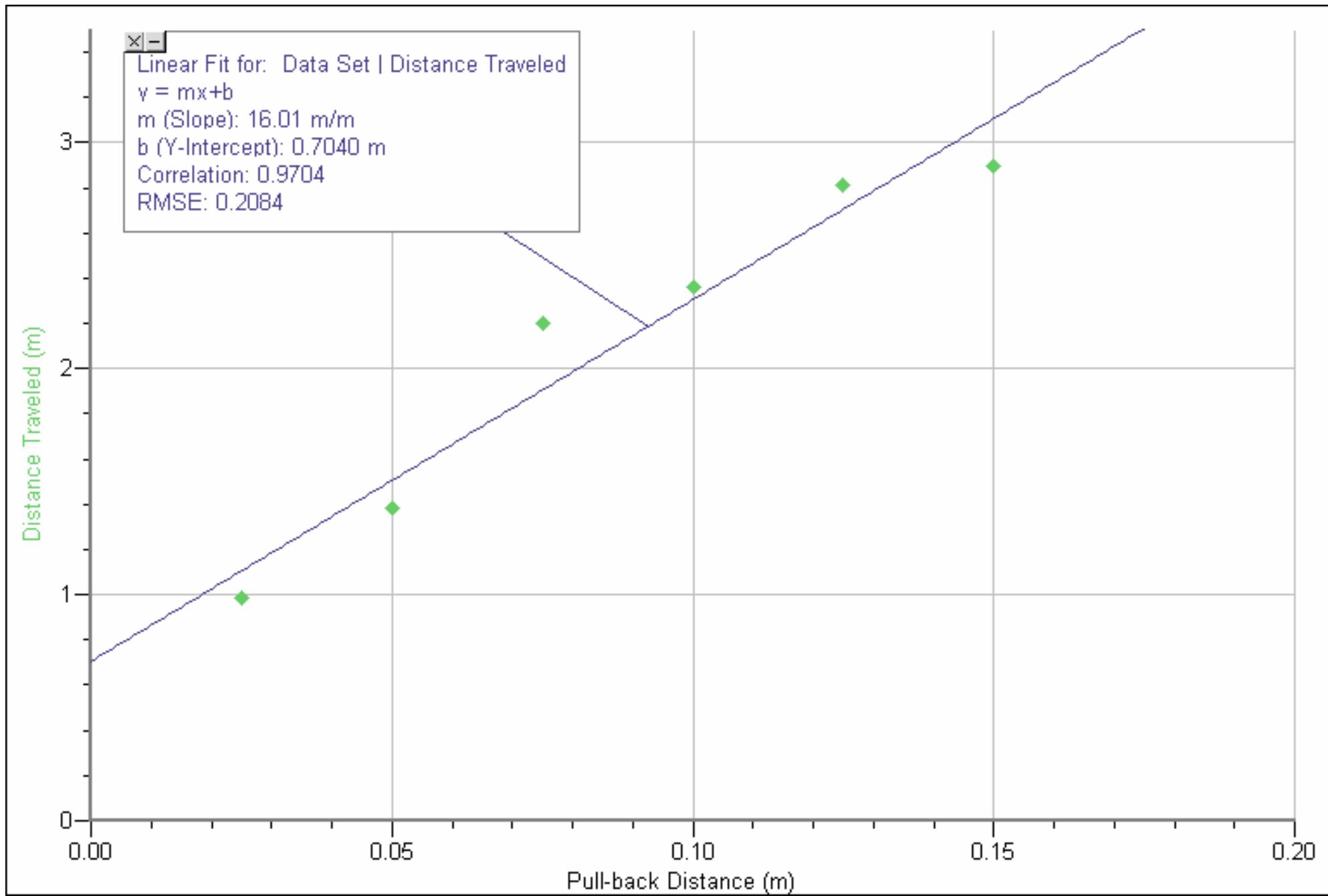
The History

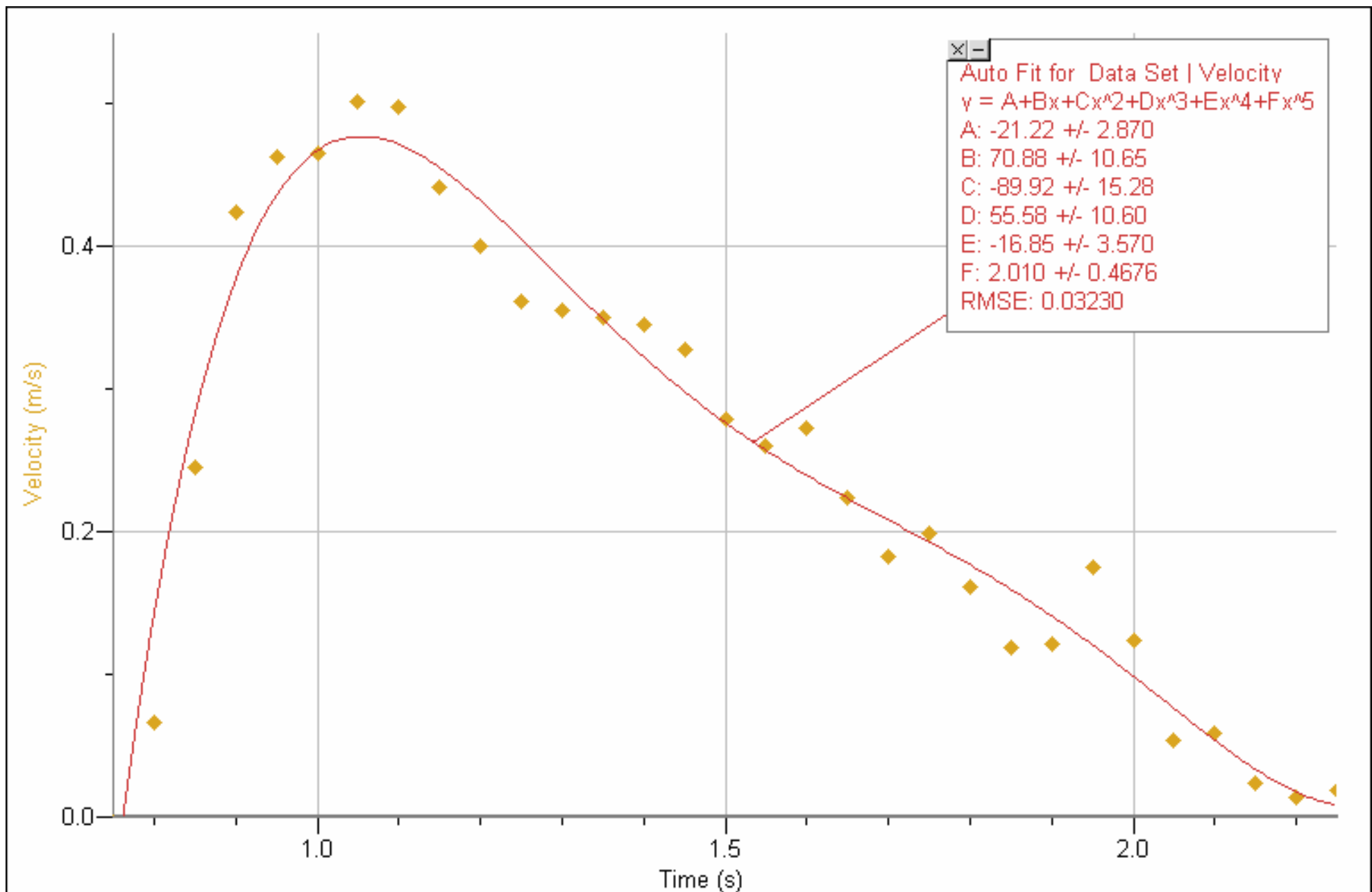
The most famous pullback car was the Choro-Q first made in 1978, by a Japanese toy company called Takara. In the United States, they were called “Penny Racers.” All of these cars had the coil-spring pullback motor and were squeezed images of an actual car. The cars have become collectables because they were inexpensive and have had various special editions.

The Motion

When the pullback car is pulled back and released, it then travels forward. To display this motion, the car was pulled back various distances for multiple trials. The average distances traveled for the pull back distances of 0.025, 0.050, 0.075, 0.100, 0.125, and 0.150 are shown in the graph below, along with its best fit line. The second graph displays the velocity of the car, when pulled back three centimeters, over time, showing how the car accelerates due to the mechanics of the toy and then decelerates due to friction.

To make the car move 16 times the distance it was pulled back, as determined by the slope of the first graph, energy must be stored quickly but released slowly. This happens because of using two different gear trains in the same tiny gearbox – because of gear ratios, when the car is pulled back, the spring tightens sixteen times faster than it unwinds.





The Mechanics

The pull back car, like any other car, has two main parts, the body and the chassis. The body is the metal or plastic outer shell of the car. The chassis contains the wheels and axles and the gear box. The back set of wheels and their axle is attached to the gearbox. The gearbox contains the gears. When the wheels are turned the axle turns with them, which in turn winds the series of gears.

The Efficiency

The pullback car is an inexpensive and inefficient toy. First, while testing, the cars wheels would move off the center of their rims. Furthermore, the car did not travel in a straight line during any of the tests. Lastly, when pulling the car back at the same distance, the distance traveled varied very much trial to trial. For example, the set of trials with a pull back distance of 10 cm varied from 182 to 304 cm of distance traveled.

Pictures

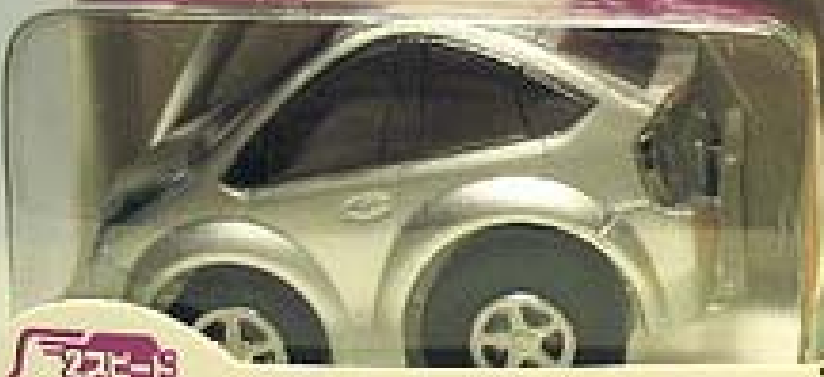


88
プリウス

チロロ



途中からはずれず走るエンジン



CHORO-Q

— 車体は2色 —
チカラ

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71
ホイールローダー

チロロ



ゆっくり走るエンジン



安全+第一



CHORO-Q

— 車体は2色 —
チカラ

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Poster Layout

