



## Curiosity Guide #601

### Collisions

Accompanies Curious Crew, Season 6, Episode 1 (#601)

#### Mini Car Collisions

Investigation #6

#### Description

Crash some cars in this crazy investigation!

#### Materials

- Plastic car track
- Toy cars with similar mass
- Toy cars with greater mass
- Adhesive Velcro
- Blocks
- Tape

#### Procedure

- 1) Stack blocks about 4 feet apart.
- 2) Set up the car track so that it creates a u-shape, with both ends rising up to the top of the stacked blocks. Tape the track in place.
- 3) Predict what will happen when cars with similar mass are released from each end of the track. Try the experiment. What did you notice?
- 4) Try a second time with a more massive and a less massive car. Before the trial, predict what will happen. Were you right? What did you notice?
- 5) Place adhesive Velcro on the bumper of each of two cars with similar mass. Predict what will happen when these cars are released. Release the similar cars. What did you notice?

6) Predict what will happen with one car stationary in the middle of the track. Try the experiment. Were you right? What did you notice?

## My Results

## Explanation

Momentum is determined by an object's mass and its speed or velocity. When cars of equal mass collide, the collisions are elastic, and the cars bounce away. When one car is more massive, there is still an elastic collision, but the more massive car continues to move in the same direction. The less massive car reverses direction with greater speed. When the Velcro cars of equal mass hit, there is an inelastic collision and the cars do not bounce away from one another.

**Think about this:** Playing pool is a great example of elastic collisions because the balls bounce off one another. The balls don't compress much, so more of the kinetic energy remains in the bounce, even though some of the energy transfers to the noise and friction on the table. The Velcroed cars we used in the experiment are like train cars that bump into each other and get coupled together. Because they get linked, that collision is inelastic. The moving train car hits the stationary car, gets linked, and moves along at a slower speed.

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