



TOY CAR RACE

Vroom, Vroom!

This schoolyard myth is almost as old as toy cars themselves. It claims that a toy car is faster going downhill than a real car. The Mythbusters' build team has joined Adam and Jamie to put this myth to the test:

Can a toy car beat a racecar using just the force of gravity? >>



FOR SCREEN VIEWING IN DART ONLY



ON THE BELTWAY.

The first task is to find out how fast a toy car can go before the wheels break or wind resistance flips the car off its track. To test the wheels, the MythBusters build a mount that will hold the toy car on top of a modified belt sander. Adam runs the sander at top speed to test how fast the car can go before the wheels break. The toy tires pass the test with flying colors, but since the top speed of the belt sander is a wimpy 43 mph, it looks like the MythBusters will have to go to plan B.

Belt sander

WHEEL-Y FAST!

To reach higher speeds, the MythBusters substitute a real car tire for the belt sander. For safety's sake, the car is jammed against a bumper so it can't roll forward. A jack lifts the rear wheels off the ground so that they can spin freely. To make a smooth test track and to reduce friction, the team covers the treads, wrapping tape around one of the tires. Next, Jamie positions a mount on the tire that will hold the toy car in place. The engine is revved up. Wow! The toy car reaches 85 mph before flying off the mount. An inspection reveals that the tires remain in good condition. The tiny wheels can hold their own at speeds that a real car can achieve.



Here we go!



Real car tire

FOR SCREEN VIEWING IN DART ONLY



BUSTER SAYS:

Friction is an invisible force that appears whenever two objects rub against each other. It doesn't matter which direction something moves, friction pulls it the other way. Move something left, friction pulls it right. Move something up, friction pulls it down. This is true even of smooth objects. These objects might look smooth, but if you could examine them under a microscope, you'd see that they're actually rough and jagged. But don't knock friction. Without it, we wouldn't be able to walk, sit, or hold a pen. Everything would fall or slip from our grasp!

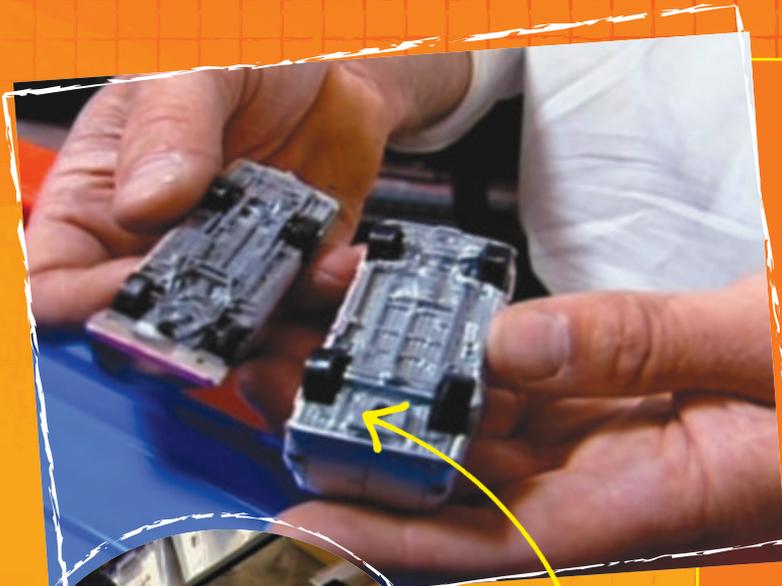
WIND FALL:

For the next experiment the build team makes a wind tunnel out of a leaf blower. After the toy cars are placed inside, a meter measures the speed at which the cars can stay suspended before flipping. It turns out that the maximum speed is between 73 and 76 mph. The wind tunnel experiment backs up the wheel-test results, suggesting toy cars can achieve speeds of more than 70 mph. The myth that a toy car can lick a real car is shaping up nicely—in the lab at least.



Wind tunnel

FOR SCREEN VIEWING IN DART ONLY



TOYING AROUND:

Each MythBuster designs a car to enter in the big race. Who can create the faster car, Adam or Jamie? Jamie takes his time experimenting with toy cars of different shapes and sizes. The van he tests is especially fast. When he turns it over, he notices that its wheels are positioned wider apart than those of the other car. Jamie incorporates this into his prototype—the Silver Bullet—a sleek aluminum car.



The wheels in the van are wider apart.

The Silver Bullet

May the best car win...

GETTING THE LEAD OUT:

Adam's opted for a chunkier model made out of lead. He's hoping that what his car lacks in design, it will make up in speed. The build team sets up a ramp in the shop for a preliminary competition. Sure enough, Adam's car is first over the line. Too bad it falls off the track! Ignoring his spill, Adam adds a few finishing touches and calls it a day.



FOR SCREEN VIEWING IN DART ONLY

BLAST FROM THE PAST

In the 1930s, a group of kids from Ohio started putting together their own "racecars." They built them from spare parts—discarded orange crates, old lumber, metal roller-skate wheels, and rope. When they were sure their cars were roadworthy, the kids raced them down some of the highest hills in town. One day, Myron Scott, a photographer for the *Dayton Daily News*, was almost run over by three kids speeding downhill on their engineless racecars. Luckily, Scott was able to dodge the speedsters and come up with a great idea, as well. He decided to hold the first official soapbox derby as a publicity stunt for his newspaper.

That was in 1934. Since then, boys and girls all over the world have caught soapbox fever. To this day, gravity racing is a global phenomenon that can count among its competitors such luminaries as 1956 Heisman Trophy winner Paul Hornung, three-time NASCAR champion Cale Yarborough, and former *Tonight Show* host Johnny Carson.



ON TRACK:

After an exhaustive search for a straight but sloped one-quarter-mile stretch, the build team has come upon the perfect venue—Ski Boulevard in Lake Tahoe. Jamie and Adam go to work putting together the world's longest toy race track—1,320 feet of it! But most of their back-breaking effort is wasted. The super-long track is not practical. The hot sun causes the track to buckle, not allowing the toy cars to make it down without flipping over. The MythBusters know when they're licked! They shorten the track to 400 feet.



Jamie repairing the track



FOR SCREEN VIEWING IN DAYTON ONLY



DOWNHILL RACERS:

With the shortened track, Adam and Jamie are ready to test run the toy cars. A white Camaro makes it down in 23 seconds. Then it's Adam's turn. His car is top-heavy and flips before it reaches the end of the track. Jamie's Silver Bullet, however, runs an impressive 18 seconds. For the final races, the Camaro and the Silver Bullet will race the real car, a Dodge Viper. Adam's car is scratched from the race.

CONCLUSION:

First up, it's the Camaro against the Viper, which is being steered by its owner. The Camaro leads for a short while, but the Viper easily crosses the finish line first. Now it's the Silver Bullet's chance to confirm or bust the toy car myth. After the signal blares, Jamie's car is the front-runner at 100 feet, but the Viper pulls ahead at the 200-foot mark for the win. The Silver Bullet clocks its best time, 17 seconds, but it's no match for the Viper. The Viper beats it by 4 seconds. It looks like this myth just got busted! Even though his car didn't achieve the overall best time, Jamie can't help but be proud of his car's performance.



BUSTED!



BUSTER SAYS:

The law of inertia states that objects at rest tend to stay at rest, and objects in motion tend to stay in motion. Imagine trying to get a huge circus elephant up from a sitting position. That's a lot of elephant to get moving. It would be easier to get a tiny mouse up and running. But once the elephant is running as fast as it can, it's awfully hard to stop it. The same is true for that big, heavy Viper and the toy car. The first 100 feet goes to the toy car, but once the Viper gets moving, it's really on a roll.

DO TRY THIS AT HOME

Perform your own road tests to find out how gravity, weight, and friction affect speed.

Materials:

- Several thick books
- 3-foot-long board
- Toy car
- Stopwatch
- Paper and pencil
- Tape
- 5 pennies
- Wax paper
- Sandpaper



1. Make a ramp by placing two books under the board. Roll the toy car down the ramp, timing it with a stopwatch. Record the time.
2. Add books to make the slope steeper. Roll the car down the ramp and record the time. Did increasing the ramp's angle cause the car to go faster or slower?
3. Put the ramp back to its original position. Tape five pennies to the top of the car. Roll the car down the ramp and record the time. Did adding weight to the car cause it to go slower or faster?
4. Remove the pennies from the car. Tape wax paper to the ramp, covering the top surface. Roll the car down the ramp and record the time.
5. Remove the wax paper and tape the sandpaper to the ramp, covering the top surface. Roll the car down the ramp and record the time. How did the speed of the car on the sandpaper compare to its speed on the wax paper?



BUSTER SAYS:

Increasing the angle of the ramp increases gravity's pull on the car, making it go faster. Extra weight also increases gravity's pull, and in the short run, increases the car's speed. The smooth surface of wax paper creates less friction on the car's wheels, so the car goes faster than when it rolls on wood. Sandpaper's rough surface increases friction and slows the car down.



BRAINBUSTERS

Are you an expert on what it takes to keep things moving? Take this true/false quiz and find out.

1. When two objects fall from the same height in a vacuum, the heavier of the two will reach the ground first.
2. If you drop a feather and marble from the roof of your house, they will both land at the same time.
3. Skiers put wax on their skis to keep them from going too fast.
4. Boots with grooves on the soles make it easier to walk on slippery surfaces.
5. The force that keeps objects from flying off into space is friction.
6. Wheels make it possible to move heavy loads more efficiently.
7. It's easier to stop a barrel full of monkeys than an empty barrel.
8. To make something start or stop, you have to overcome inertia.
9. When you throw a ball up in the air, the force that makes it fall is inertia.
10. A wave breaks on the shore because of gravity alone.

Answers on page 134

