**FAQ**

Why don't cars take off? For fast cars, staying on the ground can be a challenge. Air tries to flow under as well as over a car, which can make the whole vehicle act like a wing and try to lift off as speed rises. A 360-tonne jumbo jet only has to reach 290 kph (180 mph) to take off, so how does a 1-tonne Ferrari stay down at 300 kph (186 mph)?

One solution is to add a spoiler—a wing on the rear of a car. A spoiler creates negative lift, pushing the rear wheels down and improving grip at the same time.

**Speed machines** As with planes, cars are shaped to suit the job they do. Dragsters are built purely for acceleration in a straight line. A very long body and spoilers at both the front and rear counter the dragster's tendency to lift off the road. Massive rear wheels deliver the pushing force, accelerating the car from 0 to 550 kph (330 mph) in under 5 seconds.

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**What's the best shape**

The shape of cars has changed a lot in the last 100 years. The first cars looked like giant prams, sounded like tractors, and were barely faster than walking speed.

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**Don't stir things up**

The next rule is to help the air flow as smoothly as possible. Like golf balls and planes, cars leave a trail of swirling, turbulent air behind them, which wastes energy. Boxy shapes with sharp corners create lots of turbulence; smooth, tapering shapes create less.

**A car uses up to two-thirds of its fuel overcoming the force of drag**

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**Design Tips**

Keep the weight down
The lighter a car is, the faster it accelerates. The Ariel Atom is a third the weight of an average car and can reach 100 kph (60 mph) in 2.9 seconds. To keep the weight down it has no roof or body (but there is plenty of room for an umbrella).

Lie flat
Solar-powered cars are as flat as pancakes to minimize drag, but the driver has to lie down. The flat shape also provides room for the car's solar panels.

Channel the airflow
By taking in air at the front and chanellng it at speed under its bodywork, the Pagani Zonda creates a low pressure zone below that helps keep its lightweight carbon body pressed down.

What not to drive
Before car designers started using wind tunnels, they made cars look streamlined but got the physics wrong. The Lamborghini Miura of the 1960s was the top supercar of its day. It was sleek, sophisticated, and fast—but totally uncontrollable above 240 kph (150 mph) because the wheels wouldn't stay on the road.