

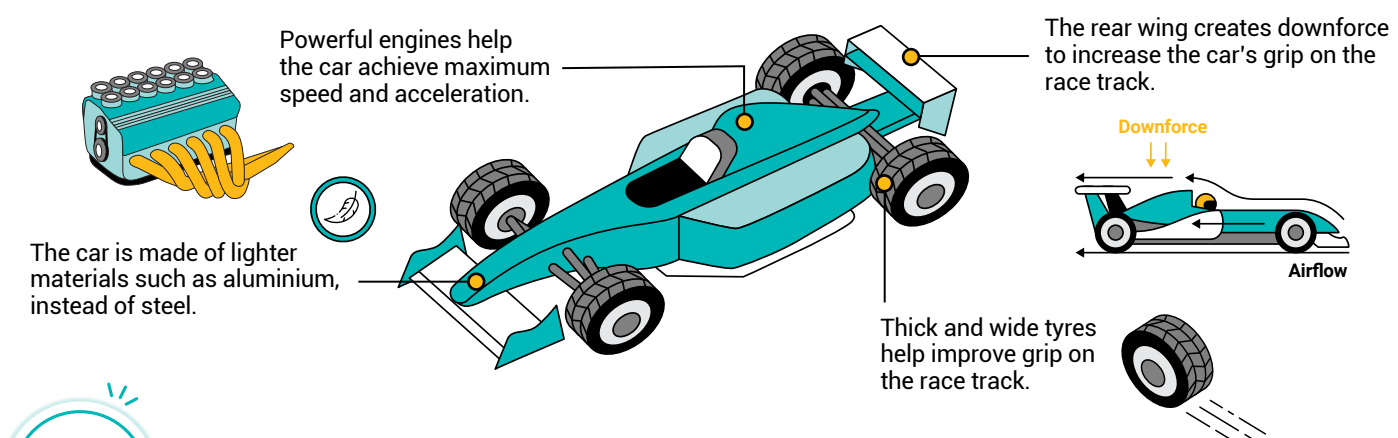
# CARS IN ACTION

In motor sports such as Formula 1 racing – where speed is the determining factor in winning – high-powered cars are designed to achieve maximum speed.

To travel at the highest possible speed, a running vehicle would need to overcome forces such as **friction** on the road. Before the start of a race, drivers will spin their wheels to remove debris on their car tyres. In turn, pit crew members will remove excess rubber that comes off the tyres. This ensures that no substances come between the race track and the tyres, which reduces friction on the road and allows the car to travel at a higher speed.

A Formula 1 car can also travel on the race track more quickly and stably thanks to its rear wing. The rear wing channels airflow such that downforce – air that pushes down on the car – is created. Downforce pushes weight on the car, keeping it firmly on the race track. This allows the car to achieve high speeds without losing grip, especially when driving around tricky corners on a circuit!

Notice how Formula 1 cars have wide and thick tyres? The tyres are designed this way to improve grip as the car travels on the race track.



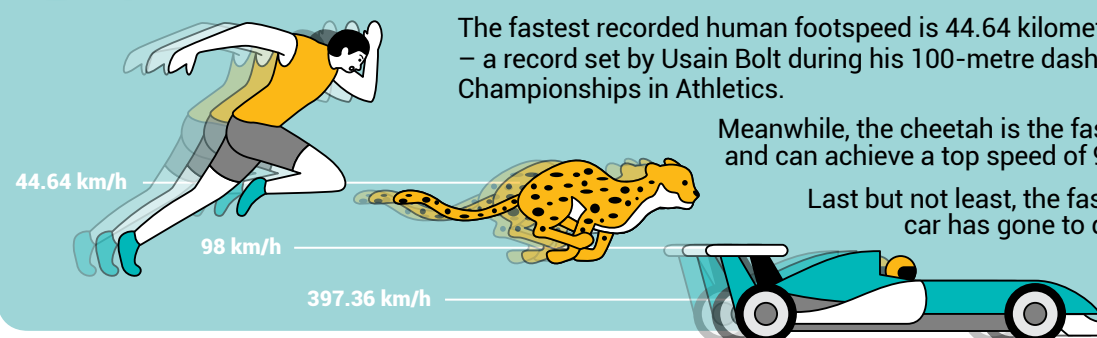
## FUN FACT

### Who Is the Fastest of Them All?

The fastest recorded human footspeed is 44.64 kilometres per hour (km/h) – a record set by Usain Bolt during his 100-metre dash at the 2009 World Championships in Athletics.

Meanwhile, the cheetah is the fastest animal on land and can achieve a top speed of 98 km/h.

Last but not least, the fastest that a Formula 1 car has gone to date is 397.36 km/h!



#### Sources:

"Newton's three laws and Racing". *Henryford.org*, 2013, [http://ophelia.sdsu.edu:8080/henryford\\_org/06-07-2013/education/erb/ScienceAutoRacingUnitPlanBackground2A.pdf/](http://ophelia.sdsu.edu:8080/henryford_org/06-07-2013/education/erb/ScienceAutoRacingUnitPlanBackground2A.pdf/), Accessed 3 June 2020.

"The long read: Chasing 400km/h in the world's fastest F1 car". *Formula 1*, 2017, <https://www.formula1.com/en/latest/article.the-long-read-chasing-400km-h-in-the-worlds-fastest-f1-car.4KJFhbfaU8GgqUEgskQeU.html>, Accessed 26 June 2020.

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Lanier, Wendy Hinote. *The Science of Speed*. Core Library, 2017.

Shukla, Aditya. "The Aerodynamics of Formula Cars". *Autocurious*, 2019. <https://autocurious.com/the-aerodynamics-of-formula-cars/>, Accessed 11 August 2020.

Yates, Christian. "The maths behind the fastest person on Earth (and no it's not Usain Bolt)". *The Conversation*, 2016, <https://theconversation.com/the-maths-behind-the-fastest-person-on-earth-and-no-its-not-usain-bolt-63732>, Accessed 26 July 2020.

ACTIVITY

# Bumper Cars and Newton's Laws of Motion

If you have ever been to an amusement park, you might have seen or driven a bumper car. Can you use Newton's Three Laws of Motion to describe what happens when bumper cars collide?

Test yourself with the activity below!

**Newton's Laws of Motion** describe how objects behave when they are in motion, at rest, or have forces acting upon them.



TRY THIS

Fill in the blanks to identify Newton's Laws of Motion. Next, match the laws to the corresponding examples of them at work.

What the laws say	Examples of the laws at work
<p><b>FIRST LAW</b></p> <p>A moving or resting object continues moving or resting respectively, unless an outside _____ acts on it.</p>	<p>When one bumper car hits another, the two move in opposite directions.</p>
<p><b>SECOND LAW</b></p> <p>The greater the _____ of an object, the more force it takes to change its speed.</p>	<p>A jolt is felt when bumper cars collide.</p>
<p><b>THIRD LAW</b></p> <p>For every action, there is an equal and _____ reaction.</p>	<p>When bumper cars collide, lighter drivers in the cars are jolted and moved more so than heavier drivers.</p>

**FIRST LAW**

A moving or resting object continues moving or resting respectively, unless an outside \_\_\_\_\_ acts on it.

**SECOND LAW**

The greater the \_\_\_\_\_ of an object, the more force it takes to change its speed.

**THIRD LAW**

For every action, there is an equal and \_\_\_\_\_ reaction.

Examples of the laws at work

When one bumper car hits another, the two move in opposite directions.

A jolt is felt when bumper cars collide.

When bumper cars collide, lighter drivers in the cars are jolted and moved more so than heavier drivers.



Recommended Reads

**The Tech Behind Race Cars**  
 Author: Steve Goldsworthy  
 Call No. Y 629.228 GOL  
 Publisher: Capstone, 2020.

**The Science of Speed**  
 Author: Wendy Hinote Lanier  
 Call No. J 531 LAN  
 Publisher: Core Library, 2017.

**Ride That Roller Coaster! Forces at an Amusement Park**  
 Author: Richard and Louise Spilsbury  
 Call No. J 531 SPI  
 Publisher: Heinemann Raintree, 2016.

Source: Spilsbury, Louise and Richard Spilsbury. *Ride that Roller Coaster! Forces at an Amusement Park*. Heinemann Raintree, 2016.

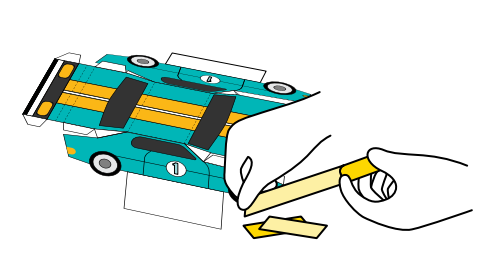
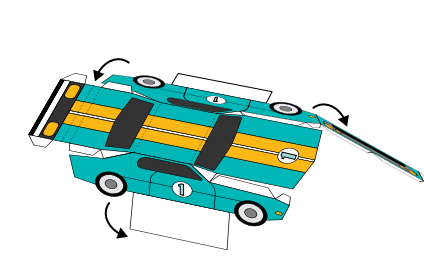
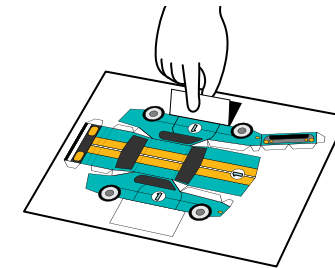
POP OUT!

# Built for Speed

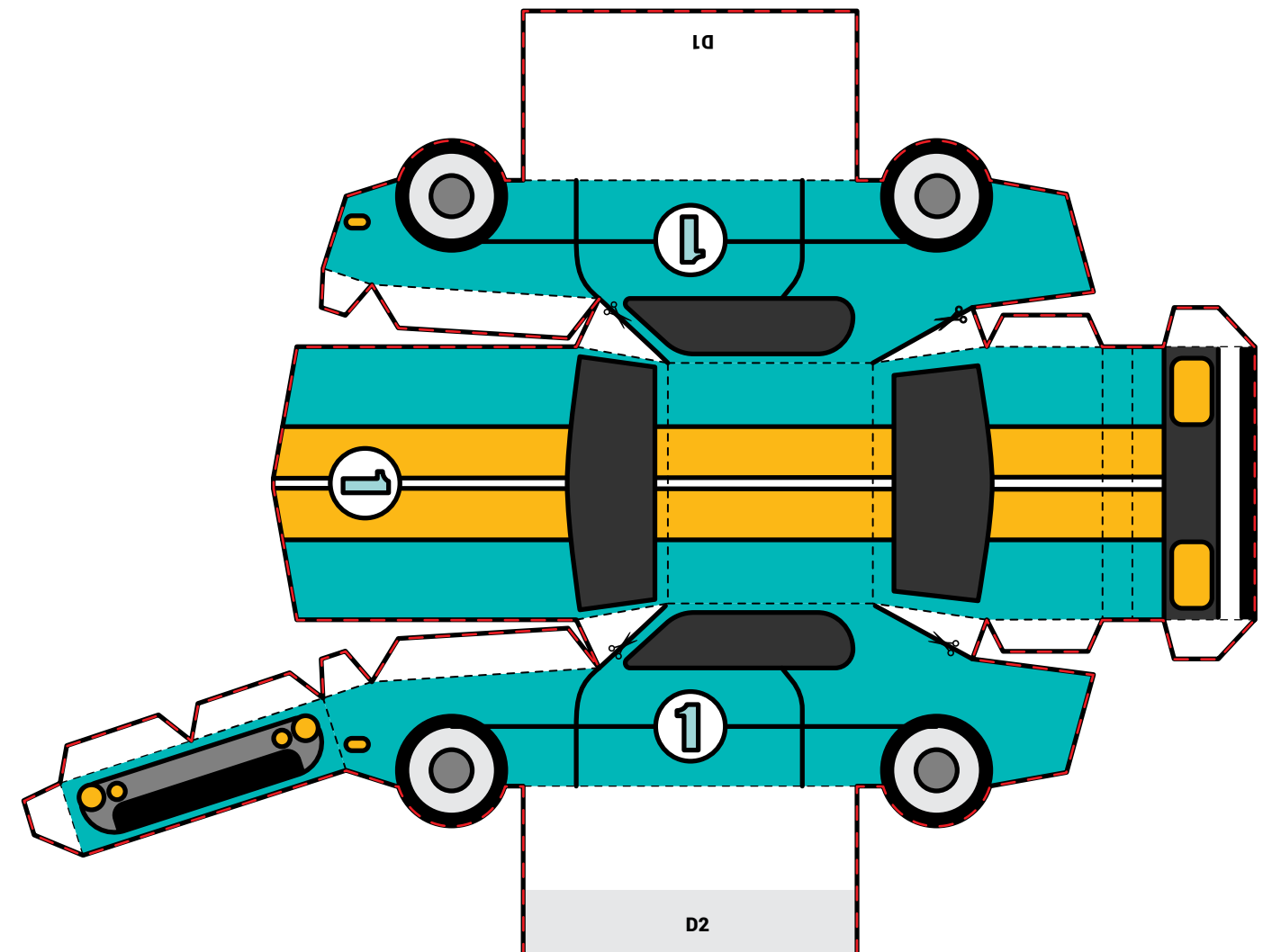
Make your dream race car!

Instructions:

- 1 Pop the car template out along the perforated lines.
- 2 Fold along the dashed lines.
- 3 Use double-sided tape on the flaps to hold your car together. Flaps D1 and D2 will form the underside of the car.



**Tip:** Save flaps D1 and D2 for last. Tape D1 over the grey area on D2.



Source: \*Moldes de carros, ônibus, meios de transporte para recortar, montar ou usar em maquetes!\*. Espaço Educar, (n.d.), <https://www.espacoeducar.net/2012/06/moldes-de-carros-ônibus-meios-de.html?m=1>. Accessed 2 July 2020.