Dr Ian Kenny
Put simply, it makes them fly further, usually 200 yards further for an elite golfer.

The flow of air around an object can be described as either laminar or turbulent flow - smooth or choppy air flow.

A laminar flow past a round shape will result in the separation of the flow behind the ball. The flow of the wind will stream outwards behind the object, like the way that ripples spread apart behind a duck or boat on the water.

Flow of air around a rough shape, like a dimpled golf ball, will be turbulent and although this can generate more drag, the air flow sticks to the surface and separates much less easily. This means that dimpled balls overall cause the least disruption of the air and travel much more efficiently and further.

In golf it's all about the direction and distance the ball flies. Golf balls are designed to react differently to swing speed, typical spin rates and ground conditions. A drive shot will have a relatively low backspin rate giving the ball more flight distance, but an iron shot will produce much higher ball spin and aid control of the ball when it lands on the green. They are made from a variety of materials and in a range of methods, to provide more desirable flight characteristics to meet the needs of professionals and amateurs.

All golf shots have backspin which is when the ball rotates backwards along a horizontal axis in a direction opposite to its flight path. Backspin allows the air around a dimpled ball to travel with it in a direction that creates a pocket of low pressure at the top and high pressure at the bottom.

It is easier for an object to move from an area of high to low pressure, therefore the ball will lift and there is flight until the spin degenerates sufficiently that the weight of the ball overcomes lift and brings it back to earth.

Why is a golf ball dimpled?

Dr Ian Kenny
Few sports require such a range of equipment as does the game of golf. There are different types of golf clubs, such as drivers and irons, and balls, to suit different occasions and conditions - and all are constantly being updated.

New materials and fabrication methods have enabled introduction of larger driver heads, as well as lighter and stronger shafts - the stick part of the club - with varying degrees of flexibility.

Statistics show that the average driving distance for the top 150 players in the US Professional Golfers' Association (PGA) increased steadily over the 1990s but has plateaued.

The introduction around 1995 of titanium driver clubheads, which were thin, hollow and large in volume, had been a major breakthrough in club technology.

But golf's governing bodies, the R&A and USGA, jointly ruled in 2003 to limit the 'spring-like', trampoline effect produced by titanium club faces - the part of the clubhead that strikes the ball. Control of the "spring-like" effect of the club face was the reason for the plateau in average driving distances.

Surprisingly, even the best players in the world miss the fairway one in every three drives. Elite players have the skill to rescue most wayward drives with their next shot, so fairway misses arise when they are striving for as much distance as possible, at the occasional expense of accuracy.

While the shaft of an iron is designed to give maximum control to the player approaching the shot, the more flexible shaft in a driver is developed with the aim of hitting the ball as far as possible. A more flexible shaft will permit a degree of bend even at relatively low swing speeds, adding to the 'kick' by the driver on to the ball.

Clubhead speed is reported to be aided by increased muscular force, rotation of the hips and shoulders to a greater extent (known as X factor) and finally, delaying unwinding the wrists until late in the downswing. Simple! The next challenge is to transfer this coordination to the ball.

Balls are designed to react differently to swing speed and spin rates, so choose carefully.

So, what launch conditions do I need to impart to my dimpled ball?

Research suggests that hitting the ball at an angle of 6.5 to 10.5 degrees off the ground, low backspin of 1800-2400 RPM (aided by low club-approach angle at impact, and ball type), square club face to the ball, all matched to an average, and low hangtime swing speed of 100 mph will give you a good drive.

Deviate even by one degree of spin axis and you'll find the rough!

Dr Ian Kenny is a lecturer in Biomechanics and Course Director of the MSc Sports Performance, University of Limerick. Ian plays golf and competes in triathlon and long distance running events.

Sorcha Howell, Courtown Golf Club

Behind the science of golf

Why does my golf ball not go far and straight?

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