

## MATHEMATICS

### Eddie Woo, Platonic Solids and the Coronavirus

Eddie Woo, a teacher in New South Wales, is now well known throughout Australia through television and other media. In 2018 he was nominated as Australian of the Year, and then was listed as one of the top ten teachers in the world by the Global Teacher Prize. He now works part-time at Sydney University, while remaining a teacher of mathematics at his old school, Cherrybrook High School.

In a recent article about him in *The Age's* magazine *Spectrum* on August 29th 2020, Eddie was quoted on the importance of mathematics in understanding the shape of the coronavirus. His reference was to the “simple“ mathematical shape, called an icosahedron, which, he said, fits the shape of the coronavirus. It's a 20-faced figure made up of identical triangles (from the Greek ‘*eikosi*’, meaning twenty, + ‘*hedra*’, base). Its simplicity resides in the fact that its identical triangular faces interlock with five triangular vertices meeting at a point. The icosahedron is one of five Platonic solids. These were known and analysed by the ancient Greeks, and so named because the Greek philosopher Plato wrote about these five solids in his *Timaeus*. There is no sixth Platonic solid.

What are the other four Platonic solids? The most elementary one is a tetrahedron, with four equal triangular faces. Then a cube, with six square faces. The third is an octahedron which can be envisaged as two triangular pyramids – four identical triangular faces with a square base, joined at the base, hence its eight identical triangular faces. A twelve-sided figure is the fifth Platonic solid, called a dodecahedron, whose faces are identical pentagons.

The Platonic solids feature, as Eddie points out, in many different natural structures. Many viruses have the shape of an icosahedron, and different crystals also exhibit the structures of three Platonic solids: tetrahedron, cube and octahedron.

“Platonic solids“ can be consulted on the internet. For more about Eddie Woo, see his recent interview with Kurt Fearnley on One plus One  
(ABCiView: <https://www.abc.net.au/news/2020-08-21/photo-eddie-woo-and-kurt-fearnley/12579362?nw=0>)

Max Stephens