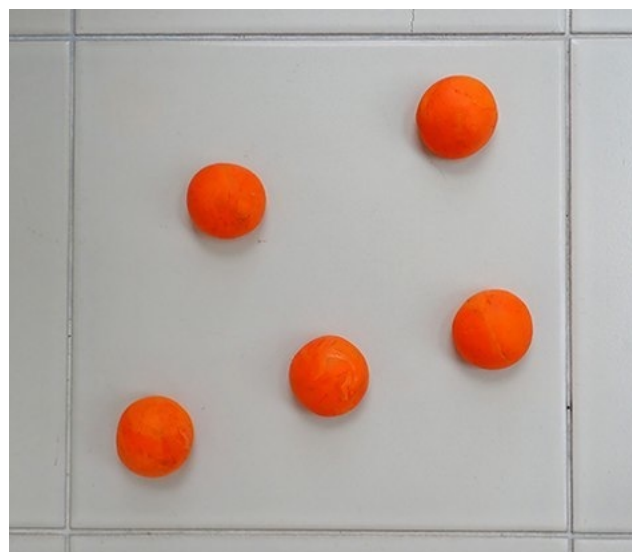


Flat ball challenge

Shannon and Ian

I play a game with with myself on hot days.



I throw a ball of clay at the floor as hard as I can, and look to see how flat and wide it gets. *Simple game - very satisfying.*

When I do this five times my flat balls look about the same size and shape with one just slightly flatter (top right).



A game is only worth playing if the outcome isn't random. If what happens doesn't depend what you do, it's a lottery, not a challenge. To find out whether *flat ball challenge* is a proper game I made five balls of the same mass (19 g) and temperature with plasticine.



The five balls had the same diameter (2.7 cm) to within half a mm.

I threw the balls at room temperature (25°C) and got flat bottom diameters of 3.3, 3.4, 3.4, 3.3 and 3.4 cm. I really tried with that last one, but again the diameter of the flat part was only 3.4 cm. As I said: I do this by myself. When I play with bigger kids I mostly lose. *I think being bigger helps.* To test that idea I set up a competition.

Does player size matter?

I made four big balls and got the biggest boy I could find. We left the balls for an hour on the back of a truck to come to the same temperature, 32°C.



We fired them at the road and took a video. (Frames below).

High swing ...





Down



Nice ...

We got a result



My diameters were 4.6 and 4.7 cm. His were 6.3 and 6.4 cm. I lost. Clearly my playing *Flat Ball Challenge* with big boys is not smart.

Dad says this is about *energy* ...

*“A bigger, stronger person can make the ball hit the road faster. A faster ball has more **kinetic energy** (energy of motion). More kinetic energy means a flatter ball.”*

“Understanding the concept of ‘energy’ is a little bit like understanding the concept of ‘father’. The word ‘father’ has a long history in culture and spoken language, tens of thousands of years, and a history of millions of years in the evolution of our species. Everyone knows what a ‘father’ is. We all developed an understanding of the concept from usage. Nobody learns what ‘father’ means from a definition.”

“So too with the concept of ‘energy’. We learn to understand the limitations and opportunities contained in the concept by usage, but remember, the word ‘energy’ in English is less than 200 years old.”

“Be patient: ‘energy’ is a new concept, not fully understood by many adults. You will understand as you use the word in many contexts.”