

TRADURRE IN ITALIANO IL TESTO SEGUENTE:

## Roger Penrose

Roger Penrose, a professor of mathematics at the University of Oxford in England, pursues an active interest in recreational maths which he shared with his father. While most of his work pertains to relativity theory and quantum physics, he is fascinated with a field of geometry known as *tessellation*, the covering of a surface with tiles of prescribed shapes.

Penrose received his Ph.D. at Cambridge in algebraic geometry. While there, he began playing around with what appears to be a somewhat frivolous geometrical puzzle: he wanted to cover a flat surface with tiles so that there were no gaps and no overlaps. There are several shapes that will do the job, regular triangles, rectangles, hexagons, and so forth. Or it can be done with combinations of shapes, resulting in a pattern that repeats regularly. Penrose began to work on the problem of whether a set of shapes could be found which would tile a surface but without generating a repeating pattern (known as quasi-symmetry). It turned out this was a problem that couldn't be solved computationally. So, armed with only a notebook and pencil, Penrose set about developing sets of tiles that produce "quasi-periodic" patterns: at first glance the pattern seems to repeat regularly, but on closer examination you find it is not quite so.

Eventually Penrose found a solution to the problem but it required many thousands of different shapes. After years of research and careful study, he successfully reduced the number to six and later down to an incredible two.

While this may all sound rather far removed from life in the real world, it turns out that some chemical substances will form crystals in a quasi-periodic manner. Professor Penrose tells of a striking demonstration of the benefits of pure research: a French company has recently found a very practical application for substances that form these quasi-crystals – they make excellent non-scratch coating for frying pans.

TRADURRE IN INGLESE LE FRASI SEGUENTI:

1. Quanti lati ha un esagono?
2. Non si può ricoprire il piano con pentagoni regolari.
3. La tassellazione trovata da Penrose richiede solo due forme diverse.
4. Le tassellazioni quasi-periodiche riflettono la struttura geometrica dei quasi-cristalli.
5. La ricerca matematica pura può avere inaspettate applicazioni pratiche.