

# MY BOX OF STEAM Mathematics "GEOMETRY OF FLOWERS"

Fibonacci The mathematical nature



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Mathematics "GEOMETRY OF FLOWERS"  
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Leonardo Bonacci, mathematician, called the Fibonacci (contraction from Latin filius Bonacci: “son of Bonacci” ) born in Pisa, c. September 1170 and died in Pisa c. 1242.



## THE MATHEMATICAL NATURE

Leonardo had the good fortune to be the son of a wealthy Pisan merchant. In order to search for spices and new products with which to entice his customers, he often undertook long journeys that led him, together with his father Guglielmo, to magnificent and exotic cities in Algeria, Egypt, Syria, Sicily, Greece, and finally to the then capital Constantinople. Here, Leonardo studied in amazement the algebra books where new-looking numbers seemed to dance on the pages. Those figures could open up different and hitherto unexpected possibilities, and the more he studied them, the more he fell in love with them. They were nine digits plus a sign that no one in the West had ever seen, in Arabic they called it sifr, or zephirusin, then zevero and finally zero. Fascinated by the marvellous gardens that seemed to reproduce pieces of paradise, Leonardo was equally enchanted by the arithmetic procedures of the Islamic scholars. He was totally captivated by them, and when he returned to Pisa he began to divulge his discoveries. He was so enamoured of those figures and numbers that he dreamt of them almost every night. Sitting in his bed, before falling asleep, he would always take one last look at his algebra book, then blow out the candle and gently fall asleep.

One night, in a dream, he saw himself enter a magnificent garden full of flowers and rabbits jumping merrily about. One rabbit and then another. Then, from a bush, two of them jumped out together. From behind a climbing rose, three rabbits. And then five rabbits pawed in unison along the scented hedges...



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Leonardo looked around, enchanted. Even the flowers and plants seemed to speak in numbers: the branches full of leaves quivered as if in a dance sequence, first those below and then gently those above, so that they could fully enjoy the sun and rain, drawing an imaginary helix. Leonardo could hear that rustling inside him, but at the same time, his eyes saw many small numbers that he still could not understand. Walking through the garden, he took a closer look at the flowerbeds, each composed of different species: here was one composed only of circea flowers with two petals and another only of trillium flowers with three petals. In the next flower-bed were buttercups and a magnificent wild rose from which rabbits had earlier emerged, moving in the wind with its tender five-petalled flowers. Leonardo looked more closely at the field chrysanthemums and daisies swaying lightly beneath him, and counting the petals, he realised with amazement that they had 13, 21 or 34 petals.

Leonardo woke up with a start, in all that hopping of rabbits and flower petals there was a rule hidden. I will call it Fibonacci's rule, he said to himself proudly and picking up his algebra book, he started writing so that he would not forget anything. "In my succession, the first two terms are always equal to 1, while from the third term onwards is equal to the sum of the two preceding it!" he said to himself with great satisfaction as he noted the discovery of the new rule... which nature had discovered long before him.



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