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From Pascal to Fibonacci via a coin-tossing scenario.

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From the text: This article is the result of a collaborative effort between a mathematics teacher (the first author) and two year 10 students at a college in New Zealand. Our aim here is to provide a proof of the fact that the sum of the entries on any diagonal of Pascal's triangle is a Fibonacci number. Although this result is well-known (there are indeed several ways of demonstrating it), our proof is possibly somewhat novel in that we adopt a combinatorial (i.e. counting) approach and do not use directly the fact that any entry in Pascal's triangle is the sum of the two entries immediately above it. This would make an excellent teacher-led activity for a class of able students in the 16 to 18 age range.

Classification: F60 H20 K20 I30

Keywords: diagonals of Pascal's triangle; number theory; Fibonacci sequence; Fibonacci numbers; combinatorics; combinations; proofs