

1125-VN-1509 **Thomas J. Osler*** (osler@rowan.edu), 233 Pomona Ave, Glassboro, NJ, NJ 08028. *A random walk and the Riemann hypothesis for children*. Preliminary report.

The celebrated Riemann hypothesis (RH) is usually described as follows: “The complex roots of the Riemann zeta function all have real part equal to $1/2$.” To explain RH in these terms requires considerable effort. You must first define the zeta function, extend the zeta function to the entire complex plane except for the point at 1, as well as other considerations. However, there are at least 21 other “equivalent” statements of RH that are simpler. That is there are statements that are true, if and only if RH is true. One of these, given by Edmund Landau in his 1899 doctoral thesis at the University of Berlin can be interpreted (almost) in a very simple way. Here it is: (RH for children) Randomly pick a positive integer N . Find the prime factorization of N and call $w(N)$ the number of primes in this factorization (counting multiplicity). For example, $w(12) = 3$. Then RH is equivalent (almost) to the statement that $w(N)$, when N is randomly selected, has equal probability of being even or odd. How simple, and how seemingly obvious! We show how this is strongly related to a random walk in one dimension and allows us to interpret Landau’s precise equivalent RH statement. (Received September 17, 2016)