962-A1-148 **Homer S White*** (hwhite0@georgetowncollege.edu), Department of Mathematics, Campus Box 311, Georgetown College, Georgetown, KY 40324. *Godel's Theorem Via Kolmogorov Complexity.*

Godel's proof of his famous 1931 incompleteness theorem relied on a diagonalization argument so slick and counterintuitive that it doesn't stick for long in the heads of most nonspecialists. It may be simpler to explain Godel's theorem to colleagues using an approach, due to Gregory Chaitin, that turns on the concept of randomness. Let U be any fixed universal Turing machine which accepts finite binary strings as input and outputs finite binary strings. We define the Kolmogorov complexity C(x) of a string x as the length of the shortest string p such that U(p)=x. x is said to be k-random provided that C(x) > length(x)-k. Roughly speaking, a k-random string is one whose shortest description is not much shorter than the string itself. We will outline a proof that, for any omega-consistent theory that is an axiomatizable extension of arithmetic, there exist infinitely many strings x such that the statement "x is 10-random" is undecidable within that theory. (Received August 10, 2000)