

How Our Solar System Avoids Planet Collisions

A comic strip illustrates a planetary mechanism that may explain why the Solar System—despite its chaotic nature—displays long-term stability.

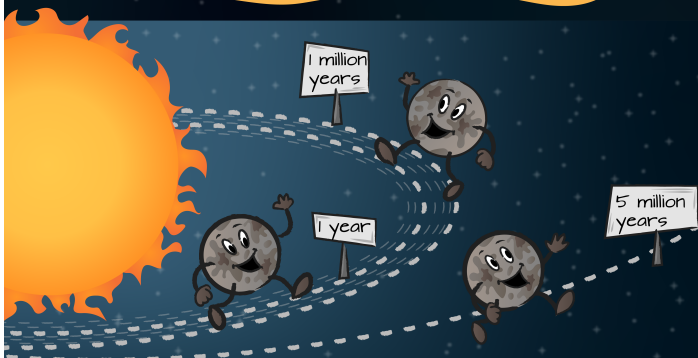
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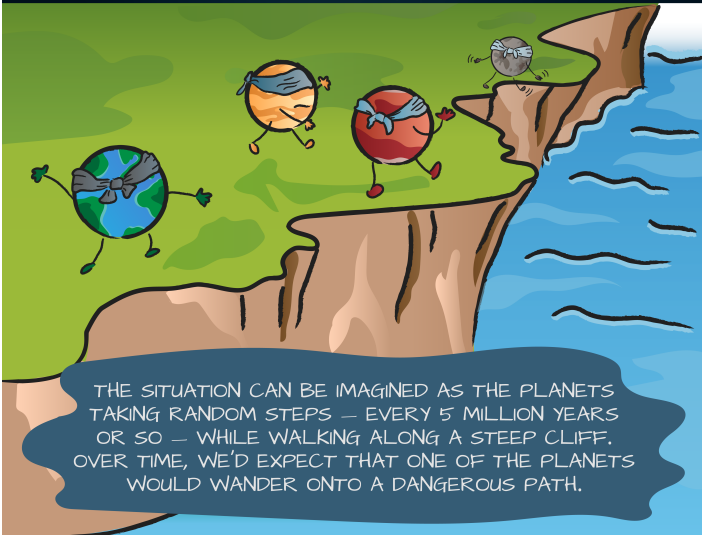
HOW OUR SOLAR SYSTEM AVOIDS PLANET COLLISIONS



SCIENTISTS HAVE PREVIOUSLY SHOWN THAT THE INNER SOLAR SYSTEM IS CHAOTIC AND THAT PLANETS CAN POTENTIALLY WANDER OFF COURSE. AND YET THE LIKELIHOOD OF A COLLISION IS UNEXPECTEDLY LOW, ACCORDING TO SIMULATIONS. NEW RESEARCH HAS FIGURED OUT A POSSIBLE REASON WHY.



THEORISTS CHARACTERIZE CHAOS BY HOW LONG IT TAKES FOR TWO POSSIBLE TRAJECTORIES TO DIVERGE. THIS IS CALLED THE LYAPUNOV TIME. THE INNER SOLAR SYSTEM'S LONG-TERM BEHAVIOR IS DESCRIBED BY 8 LYAPUNOV TIMES — THE SMALLEST WAS PREVIOUSLY FOUND TO BE 5 MILLION YEARS.



THE SITUATION CAN BE IMAGINED AS THE PLANETS TAKING RANDOM STEPS — EVERY 5 MILLION YEARS OR SO — WHILE WALKING ALONG A STEEP CLIFF. OVER TIME, WE'D EXPECT THAT ONE OF THE PLANETS WOULD WANDER ONTO A DANGEROUS PATH.

