## Non-eroding orbits of the inner planets and earths moon

Science, Astronomy

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Newton's law of gravitation states that the attraction of two objects to one another is the product of their masses divided by the square of the distance between their centers, or $F=G(m 1 m 2 / r 2)$ (Wallin). $G$ is the gravitational constant equal to $6.673 \times 10-11 \mathrm{Nm} 2 \mathrm{~kg}-2$. For example, the attraction between you and the Earth is equal to your mass times Earth's mass divided by the distance from your center to Earth's center times G.

Next, we must better understand orbits. Kepler's law of planetary motion states that the orbits of the planets are ellipses around the sun (Wallin). So, at different times they are at different distances. Because they are at different distances, the force between them differs depending on where they are concerning one another. That being true, their accelerations also differ depending on where they are in their orbits. It seems the inner planets and moons are just the right distances from one another that they help each other sustain non-eroding orbits.

This is why Mercury, Venus, and the Moon do not show significant erosion of their orbits. They are in perpetual free fall, but at such a distance from one another and the sun that their orbits are not circular. They speed up and slow down based on their distances from each other and the sun; therefore, these accelerations keep them from falling into one another.

