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our goal is to find out about scientific theories

UNIVERSAL GRAVITATION THEORY

This description of one of the fundamental forces of nature is among the greatest achievements in science. Isaac Newton came up with it in 1687 as part of his masterful *Principia Mathematica*, a three-volume description of mathematics. Universal gravitation theory says that there is a mutual attraction between anything that has mass—anything made of normal matter, that is. That attraction depends on the two masses involved, the distance between them, and a constant known as the gravitational constant. One of the central insights of the theory was that the gravitational force follows an "inverse square law." This means the attraction between the two objects diminishes as the square of the distance between them. Newton's formulation of the law was so accurate that it immediately explained the motion of the planets, creating an easy way to predict their movements relative to each other and the Sun. It has also enabled us to send rockets into space. After Einstein came up with the theory of relativity and used it to explain some small anomalies in the planetary orbits, it was realized that Newton's law was not quite the final word on gravity. However, it is almost universally accurate when applied to the gravitational attractions we encounter in everyday life.

Some ideas in modern physics suggest that Newton's law of gravitation may need adjusting to consider things separated by less than a millimeter, or more than the diameter of the Solar System. What's more, no one has a good explanation for why things with mass attract each other in the first place, why gravity is much weaker than the other forces of nature, or for the true value of the gravitational constant, which is the least-accurately-measured constant of physics.

How would a scientist go about adjusting these ideas?

What does this theory tell us about the gravitational forces between two objects?

define two words you did not know that were used in this article.

lexile level 980

cite all answers including definitions

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129

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