AWESOME stories

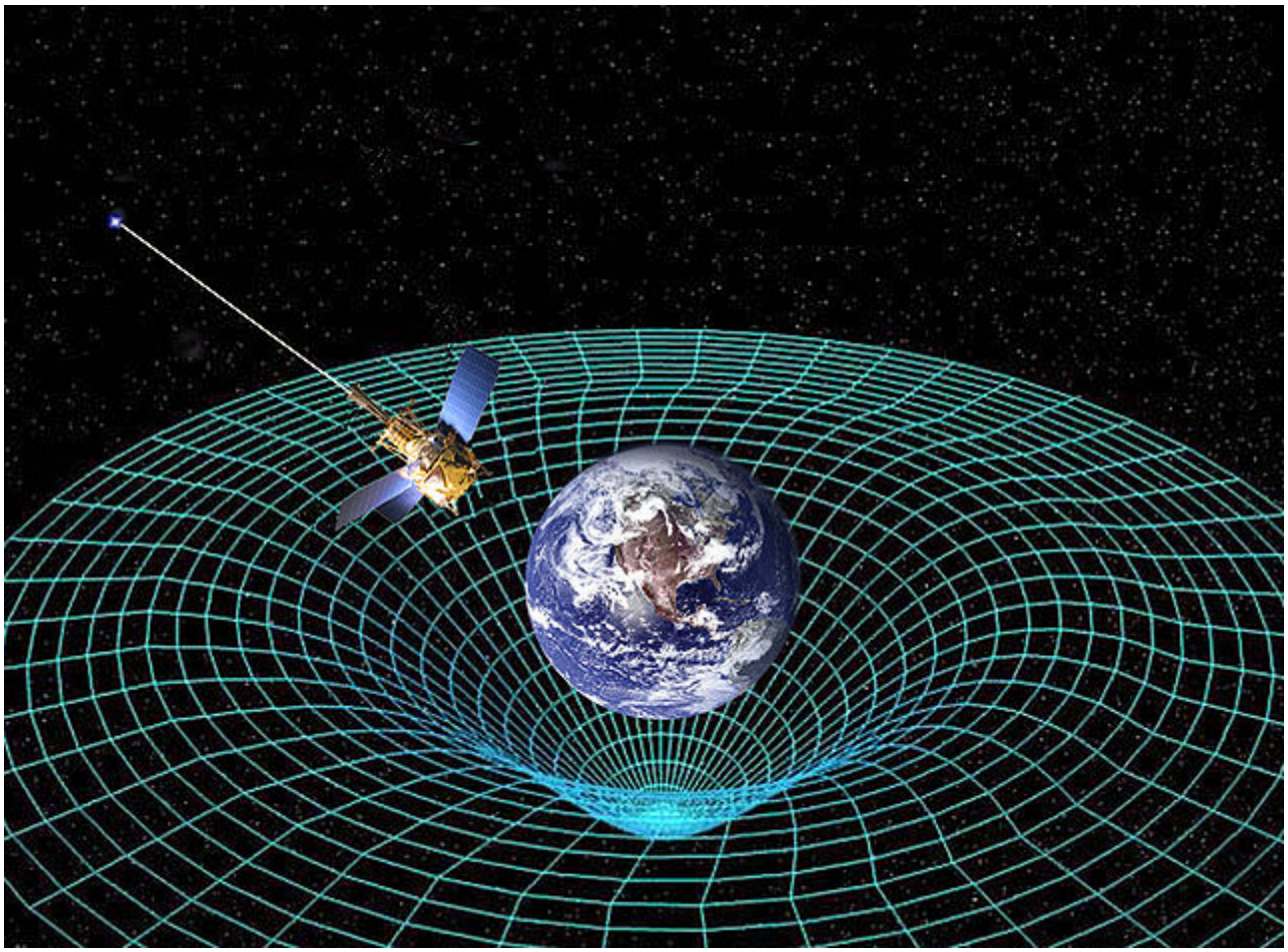
General Theory of Relativity - Einstein's Masterpiece

Isaac Newton discovered the *concept* of gravity, but no one before Einstein figured out what *caused* gravity.

Einstein's insight - known as his general theory of relativity - is that all massive bodies, like stars and galaxies, bend (or curve) space and time. When other objects, like the Earth, pass through that curvature - as depicted in this video clip - they experience the curvature's impact.

It is this bending, or curving, of space and time which causes gravity. Put differently, one could say that gravity *is* the curvature of space and time.

For example, this image - from NASA - incorporates Einstein's theories. NASA describes the illustration as follows: "Artist concept of Gravity Probe B orbiting the Earth to measure space-time, a four-dimensional description of the universe including height, width, length, and time."



In 1919, during a solar eclipse, astronomers confirmed Einstein's curvature theory when they measured the bending of starlight around the sun. Albert became an international sensation, almost overnight.

Another solar eclipse (in 1922) led to more confirming numbers. (See details about those expeditions, and their results, on pages 33-40 of "Einstein, Eddington and the 1919 Eclipse," by Peter Coles.)

Einstein's theory of general relativity ushered in the modern world. Today, for example, no one flies a major jetliner without relying on his calculations.

But there was more to Einstein's thinking.

For him, the laws of the universe were so intricately beautiful, and interconnected, that they seemed an expression of the divine. (He once said: "I believe in Spinoza's God, who reveals Himself in the lawful harmony of the world, not in a God who concerns Himself with the fate and the doings of mankind.")

The idea that the laws of the universe were an expression of the divine, however, was a concept with which other scientists disagreed. Einstein's efforts to formulate a theory, based on his beliefs, began to isolate him in his later years.

A note about the graphics used to explain gravity in the featured video clip:

Keep in mind the inherent limitations—in a video like this—of depicting moving bodies, and gravity, in a universe which is *not* at rest.

In this clip, gravity is represented by a solid sphere which rests on (and makes a depression in) a flat, flexible surface. To make the explanatory graphics better-match how things work in the real world imagine, when you watch, that the solid sphere is rolling along instead of standing still.

Credits:

From *Einstein's Unfinished Symphony*, BBC Horizon, starring David Graham as Einstein and Annette Badland as his nurse - part three. Online, courtesy BBC Worldwide Channel at YouTube. Copyright, BBC, all rights reserved. Clip provided here as fair use for educational purposes and to acquaint new viewers with the program.

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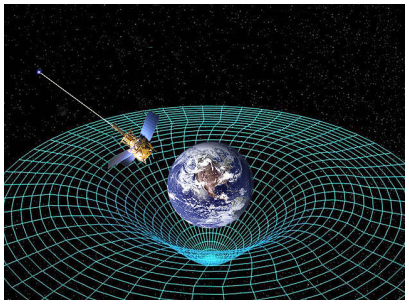

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