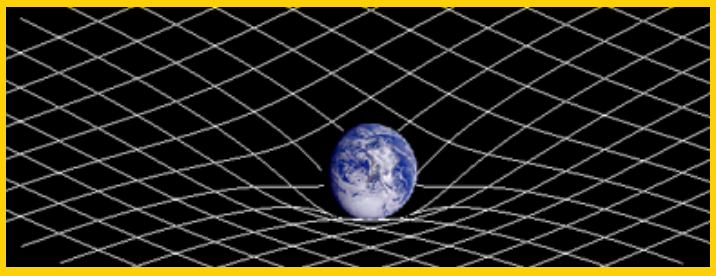
FLEXIBLE UNIVERSE

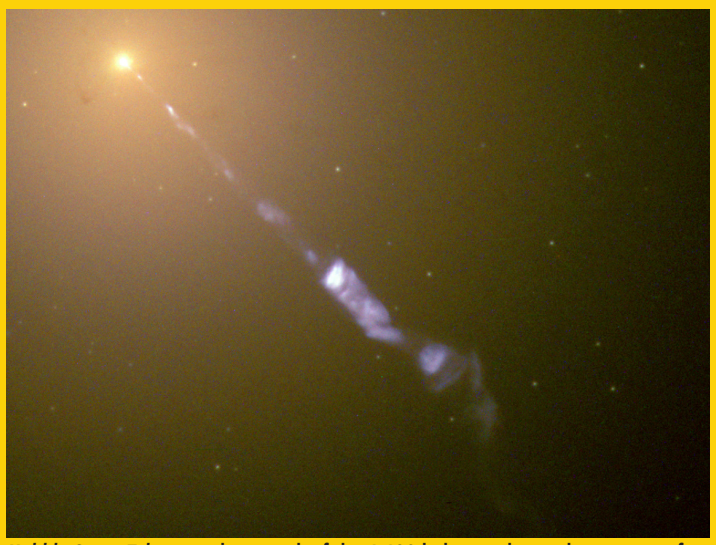
This lycra fabric represents the 'fabric' of spacetime. When objects are placed on the fabric their mass warps the fabric of spacetime. Objects with larger mass will significantly warp this surface. When smaller objects are placed next to larger masses, their orbits will follow the natural curvature of the warped spacetime.

In 1915 Albert Einstein combined the concepts of space and time into *spacetime*, joining the normal dimensions of height, width, and depth with the fourth dimension of time. This concept is part of a unified description of gravity known as the *General Theory of Relativity*.



Einstein argues that the warping of spacetime is a direct result of the momentum and energy of the matter and radiation present. Matter tells spacetime how to curve, and spacetime tells matter how to move.

The General Theory of Relativity has deep implications within the astrophysics community. It is important for making GPS satellites keep your car on the road, but it also implies the existence of black holes. These regions have so much mass in such a small area that not even light can escape their gravitational pull.



Hubble Space Telescope photograph of the 4,400 light-year long relativistic jet of Messier 87. The jet contains matter being ejected by the supermassive black hole at the center of the galaxy. The black hole has a mass of 6,000,000,000 times that of the Sun.

Observations have discovered a black hole with mass equivalent to 4,000,000 Suns at the center of the Milky Way galaxy, with much larger black holes present in many other galaxies. These black holes accelerate gas to very near the speed of light and eject that gasto distances of thousands of light years out of the galaxies.

Another result of General Relativity is that curved spacetime forces *light* to bend, much as matter moves in curved trajectories. This image is of a background galaxy (blue ring) magnified and distorted by the gravitational field of the dark matter in the foreground galaxy (red).

Scan for more information!

http://www.cgca.uwm.edu/outreach/maker.html

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