The special theory predicted that the speed of light be constant, and that nothing could travel faster. Evidence existed already in the form of the Michelson/Morley experiment, and was added to by De Sitter's observations of binary stars and Kennedy/Thorndyke experiments. Today we can measure pions moving at speeds close to c, but exceeding it; any radiation they emitting will travel at speed c.

Special relativity threw up some problems with Newtonian gravity. Newton had assumed instantaneous transmission force, but special relativity had implied no signal could travel faster than c. Then there was the equality of gravitational and inertial mass, not predicted by ~~Newtonian~~ theory, but hypothesized and successfully tested to one part in 1000 by Newton himself. Neither could Newtonian gravity explain why Mercury's orbit should advance around the Sun (by 43 arcsecs per century); it predicted the orbit be fixed in space.

~~Newto~~ Einstein fixed these problems, and solved the second at the outset of formulating relativity using the equivalence principle: The behaviour within a local spacetime region resulting from a distribution of matter cannot be distinguished from the behaviour within a local spacetime region