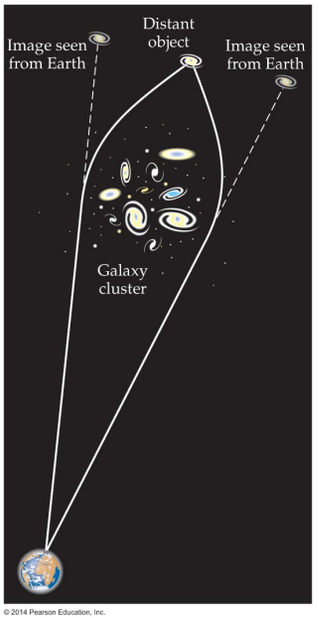
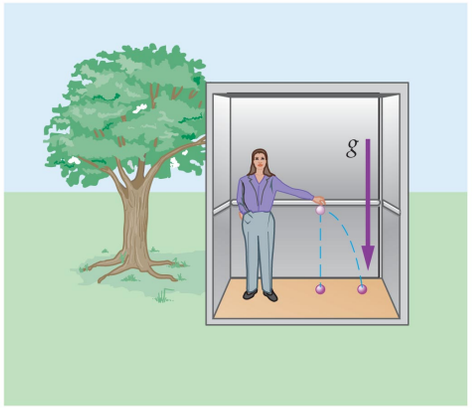
GENERAL RELATIVITY



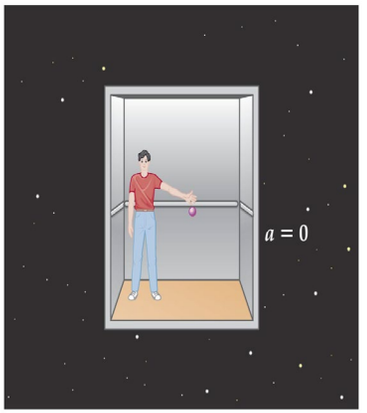
Most figures in this presentation are taken from our textbook: Pearson Physics

While Special Relativity dealt with Inertial Reference Frames, General Relativity deals with Accelerated Reference Frames.

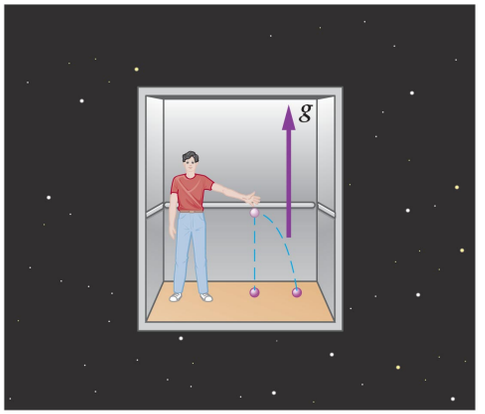
General Relativity applies to accelerating reference frames.
Any experiment conducted in a uniform gravitational field and in an accelerated reference frame will give identical results.



(a) A frame of reference in a gravitational field



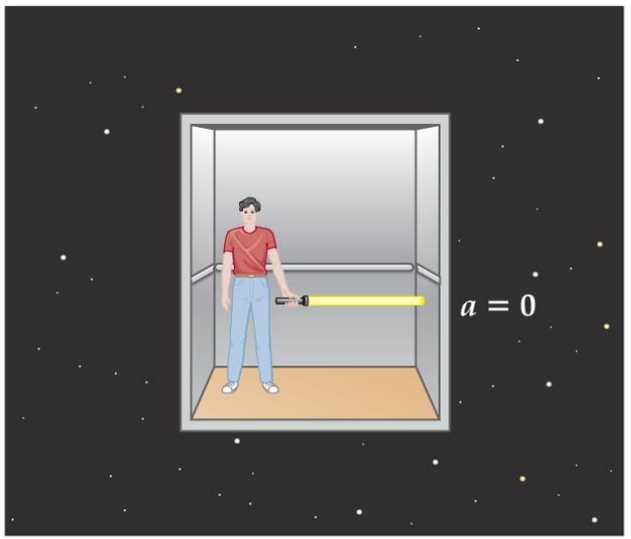
(b) An inertial frame of reference with no gravitational field



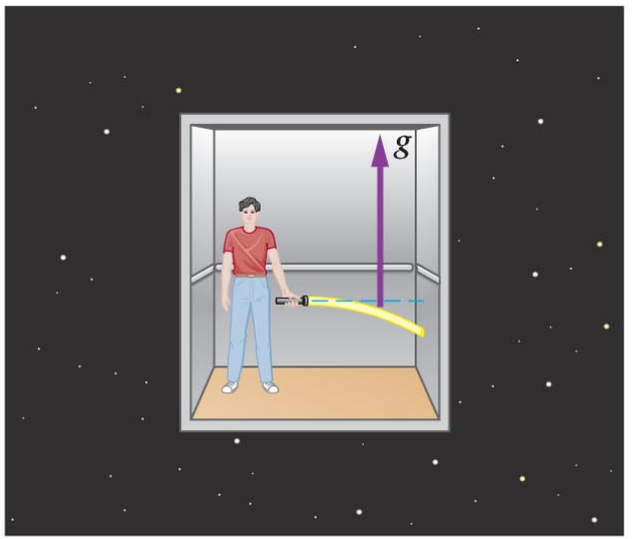
(c) An accelerated frame of reference

Principle of equivalence:
Any physical experiment conducted in a uniform gravitational field and in an accelerated frame of reference will give identical results.

General Relativity implies that gravity bends light.



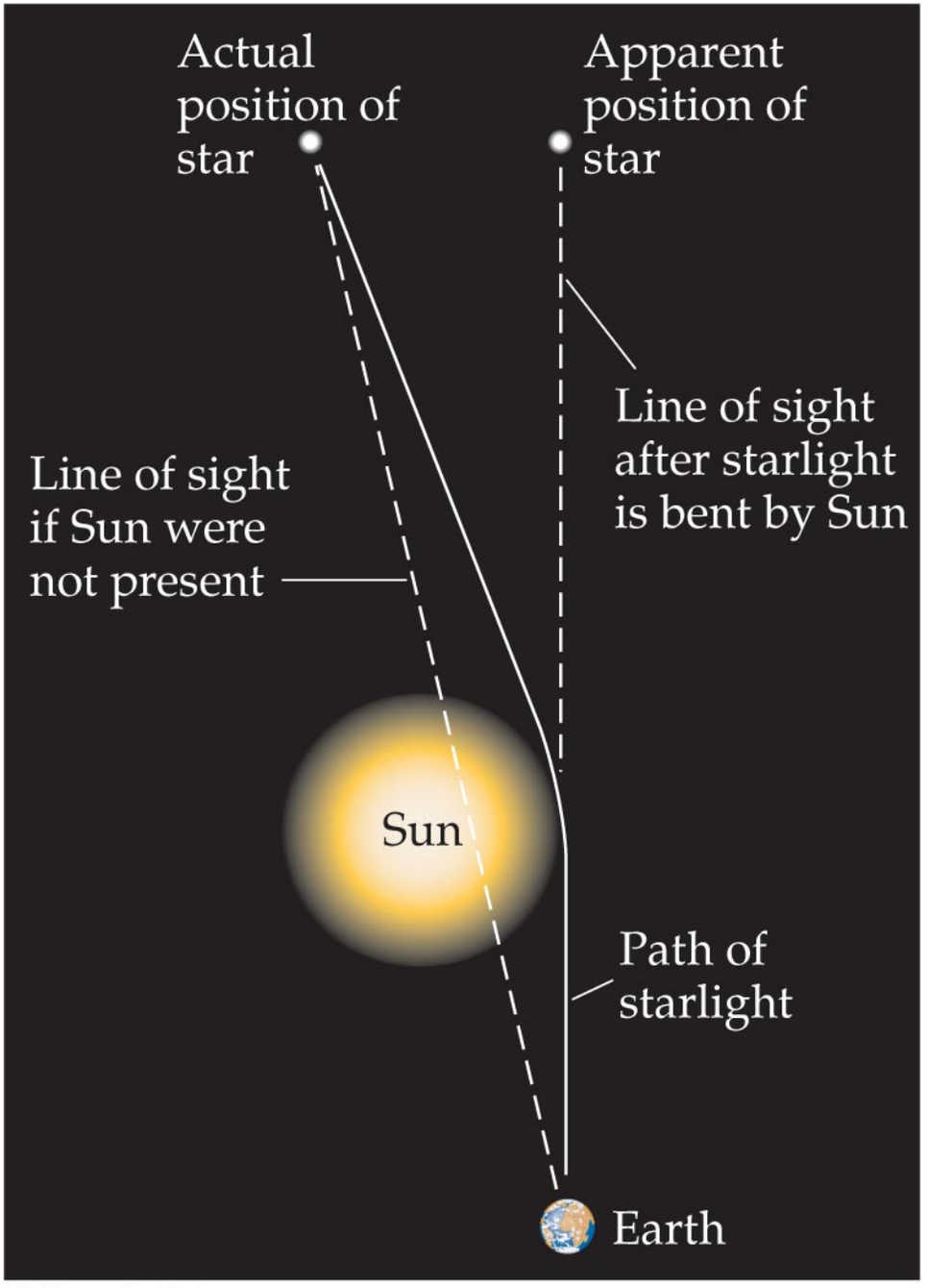
(a) Nonaccelerating elevator



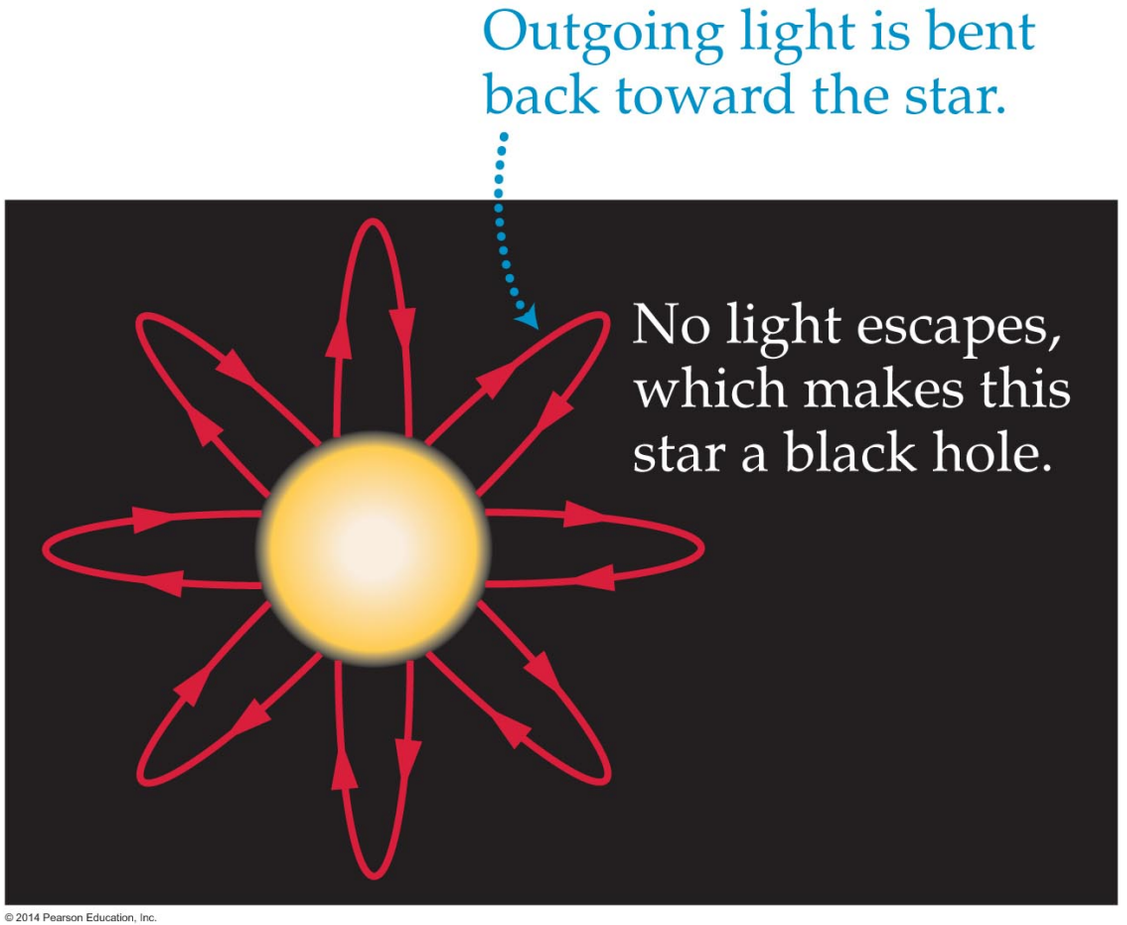
(b) Accelerating elevator

This was verified

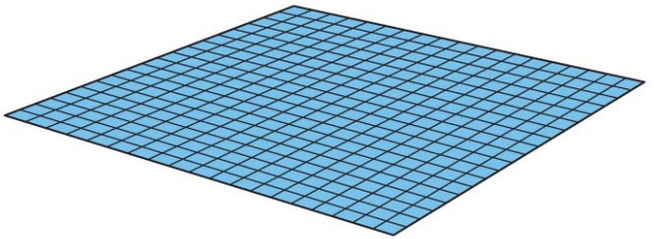
During an eclipse in 1919, pictures were taken which showed the displacement of stars compared to the background.



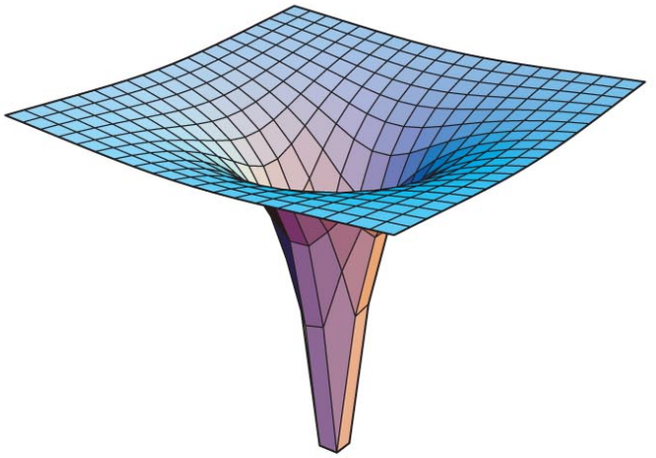
So a gravitational field can deflect light.
Taken to the extreme, that would be a BLACK HOLE, a star whose gravitational field is so strong that light cannot escape at all.



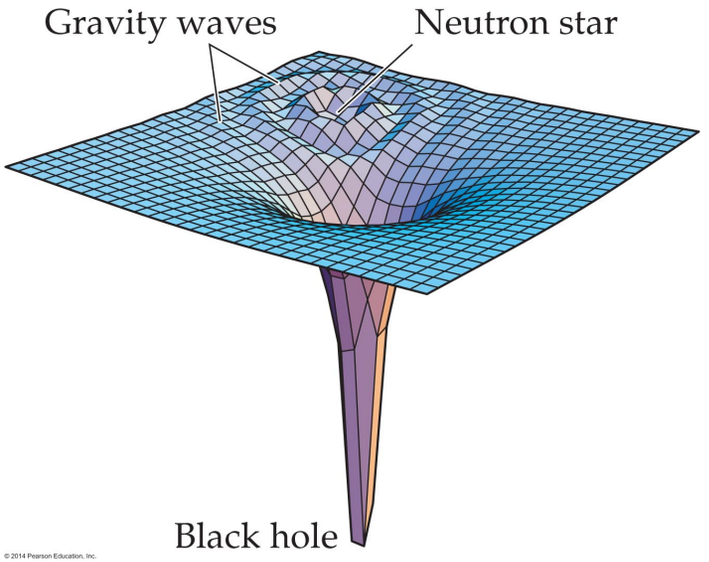
And warps space and time!



(a) Flat space, away from massive objects



(b) Warped space, near a massive object



You tube: Theory of Relativity

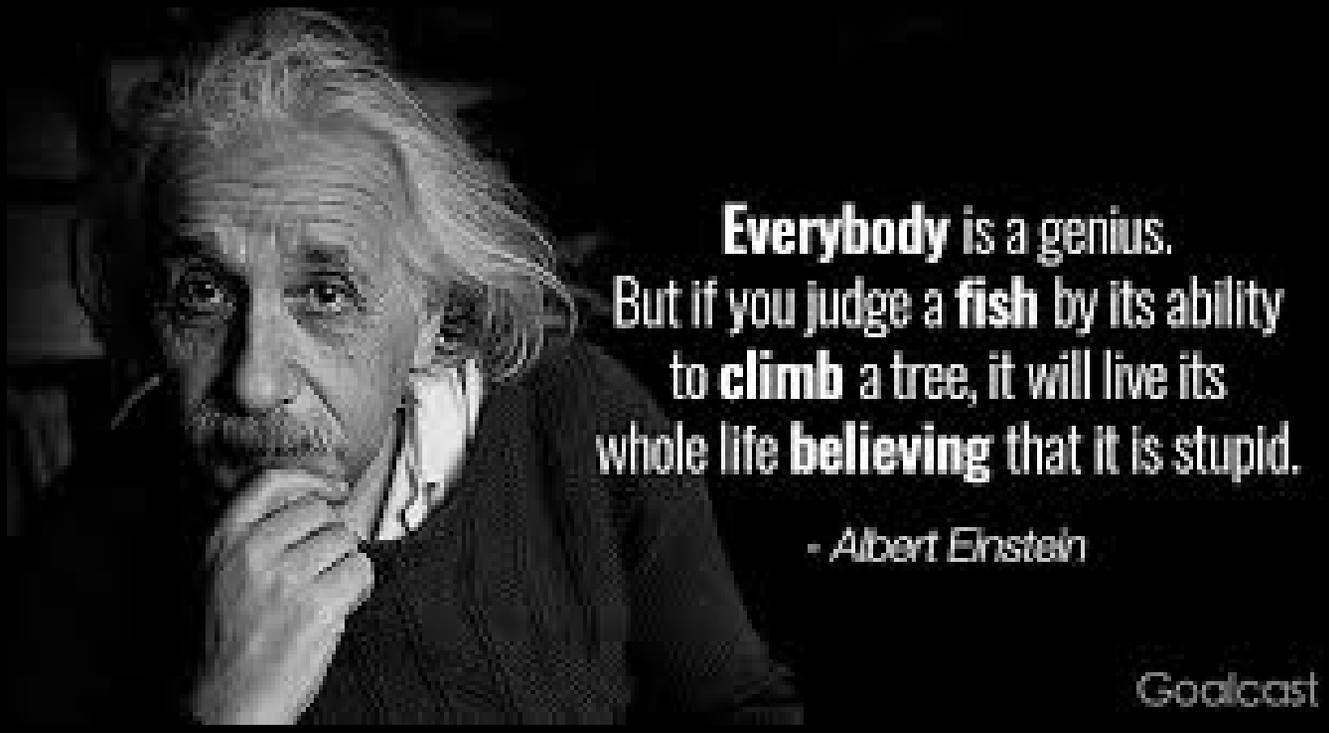
http://www.youtube.com/watch?v=AZ6N85lNgHY&feature=PlayList&p=50193D62F125C243&index=0&playnext=1

Einstein's Big Idea

http://www.youtube.com/watch?v=V7vpw4AH8QQ&feature=PlayList&p=50193D62F125C243&index=1

Time Travel Is Possible

http://www.youtube.com/watch?v=X02WMNoHSm8&NR=1


Everybody is a genius.
But if you judge a **fish** by its ability
to **climb** a tree, it will live its
whole life **believing** that it is stupid.
- *Albert Einstein*
Goalcast