Chapter 02

Solar system dynamics; phases & eclipses; celestial mechanics

Abraham Lincoln and the phase of the moon: a murder mystery

A Trip to the Moon Le Voyage Dans la Lun

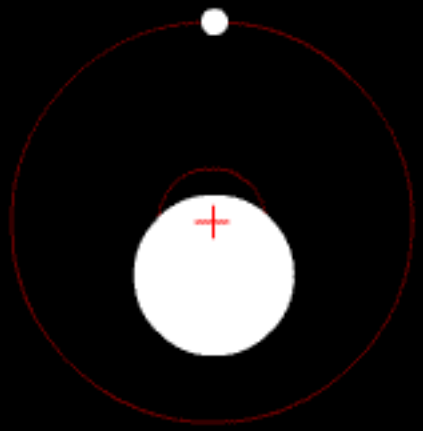
by Georges Méliès (1902; start at 05:30)

The Moon's orbital period equals its sidereal rotational period (gravitational tidal locking)

Lunar libration

Lunar libation

Barycenter for binary system with considerably different masses:



Life along the terminator of Gliese 581 c?

http://www.arcadiastreet.com/cgvistas/exoplanets/exo_0400.htm

Flora at the terminator on Gliese 581 c

The potentially earth-like extrasolar planet Gliese 581 c orbits very close to its red dwarf sun, completing an orbit in only 14 days. This planet experiences tidal forces about 400 times as strong as those that the Moon causes on the Earth, with the result that it may be tidally locked to the star with one hemisphere always day and the other always night. The sunward side would be extremely hot and the dark side extremely cold, while the narrow terminator or "twilight zone" between them might have a moderate climate possibly suitable for life.

In this image, the temperate surface at the terminator of Gliese 581 c is host to liquid water and a variety of living plants. Two smaller moons occupy the sky, though there's no evidence yet that this planet hosts any moons of its own.

This shows Musk standing at the dining room window of the Simpson's house, looking out and pontificating at the night sky as the family behind him eats dinner.

http://www.slate.com/blogs/bad_astronomy/2015/02/22/simpsons_betrayed_by_the_moon.html

Moon phases
crash course

Retrograde motion — Inferior and Superior Planets