

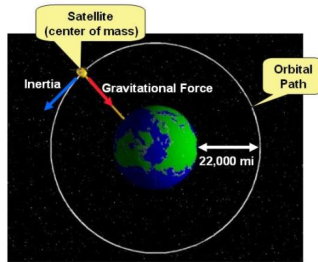
Satellite Motion 1

Satellite Motion

Objectives

Discuss satellite motion.

Calculate the tangential velocity for a satellite in orbit.



"Falling Moon"

explanation of how satellite motion would work

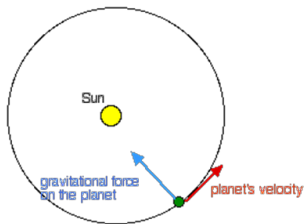
apple falls to surface of Earth b/c gravity.....moon orbits b/c gravity



Satellite Motion

An Earth satellite is simply a falling object

It is simply traveling with enough tangential velocity to fall around the Earth, rather than into it.



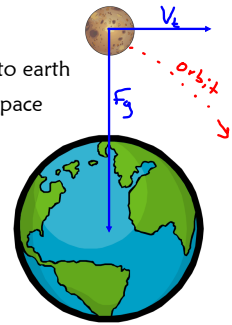
Tangential Velocity

too slow - F_g makes satellite fall into earth
too fast - satellite goes into outer space

$$v_t = \sqrt{\frac{Gm}{r}}$$

center mass

Unit: m/s

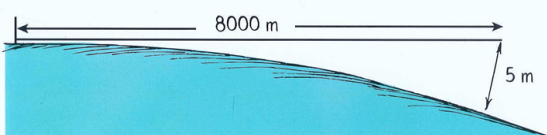


Mountain Cannon

8000 m/s

A satellite close to the Earth has a tangential speed of 8 km/s. (19,000 mi/hr)

During each second, the satellite falls 5m beneath each successive 8 km tangent.



Circular Orbits

circular orbit - v_t matches available F_g

the speed of the satellite is constant

