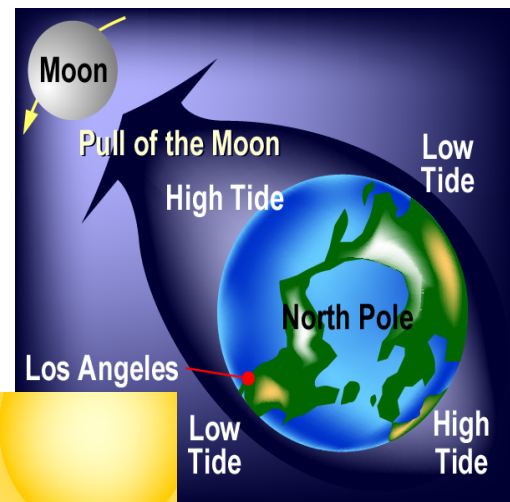
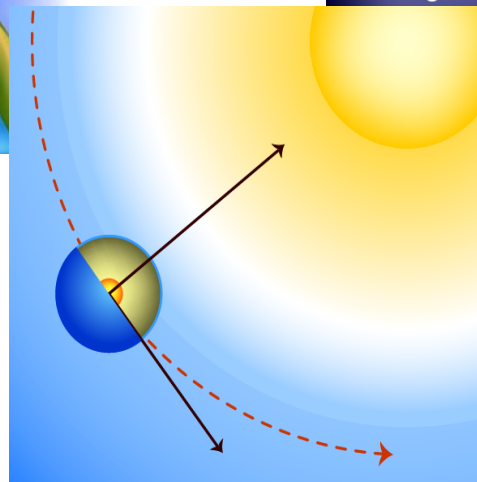


The Force of Gravity



F_g : gravitational force (force of *gravity*) - an attractive force that acts over a distance between masses



- What object is responsible for the tides on Earth, the Sun or Moon?
- What object pair has the stronger gravitational pull: Earth-Sun or Earth-Moon?

Did you know? That the interactions of the Earth-Moon tidal system is resulting in the Moon moving farther away and the Earth's spin is slowing down. Not to worry, it won't stop spinning or slow down all that much, but at some point in the distance future the Moon will only be visible from one side of the Earth.

Close Reading: Gravitational Force

Pg 130 - 133 of MHR

Terms to look for:


- Mass (kg)
- Weight (N, Newton's)
- Acceleration due to gravity (9.8 m/s^2)

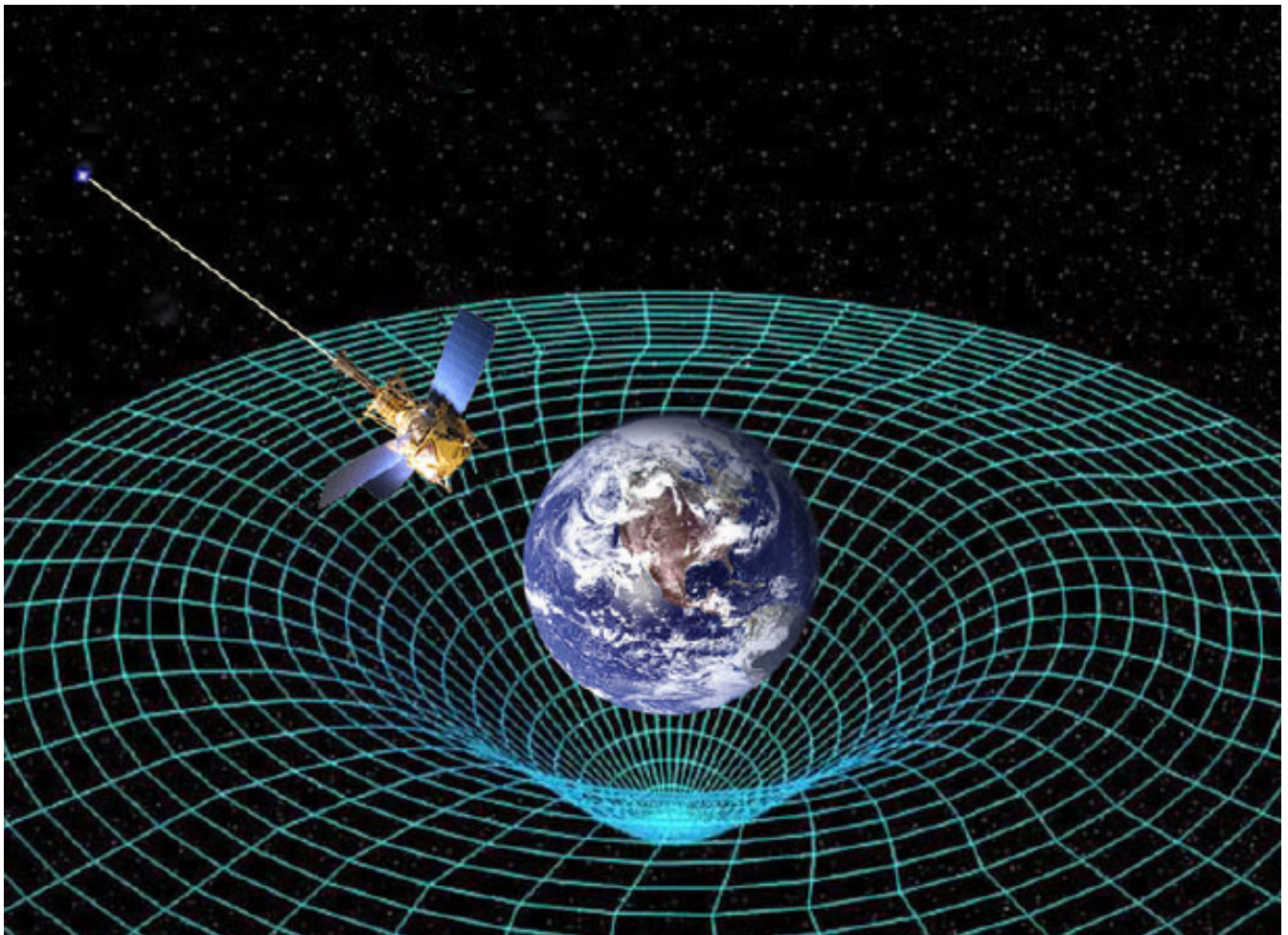
Pair and write answers to the conceptual problems on page 131.

$$F_g = mg$$

Discussion Question

The force of gravity is dependent on the distance between an object and the Earth; looking at the formula for the force of gravity, how or where is distance taken into account?





Force of Gravity Practice Problems

1. Calculate the force of gravity on a 45 kg mass located at the peak of Mt. Everest.

$$F_g = ?$$

$$m = 45 \text{ kg}$$

$$g = 9.7647 \text{ m/s}^2$$

$$F_g = m g$$

$$= (45)(9.7647)$$

$$= 439 \text{ N}$$

Newton's $\rightarrow \text{kg} \cdot \text{m/s}^2$

2. At the equator a person has a weight of 1075 N, calculate his mass.

$$F_g = 1075 \text{ N}$$

$$g = 9.7805 \text{ m/s}^2$$

$$m = ?$$

$$F_g = m g$$

$$1075 = m(9.7805)$$

$$m = 110 \text{ kg}$$

3. How many times stronger is the force of gravity at the bottom of the Mariana Trench than on the ISS? (assume the same object at each location)

$$\frac{F_g(\text{trench})}{F_g(\text{ISS})} = \frac{9.8331}{9.0795} = 1.08$$

*Unless given a specific location, take the $g = 9.81 \text{ m/s}^2$ for an object located anywhere on the Earth.

Practice Problems Pg. 12 & 13

Attachments

forces-and-motion-basics_all.jar

forces-1d_all.jar

friction_en.jar