

Chapter 10

GRAVITATION

➤ Mass and Weight:

- Mass is a fundamental, universal property. You have the same amount of mass no matter where you are in the universe.
- Weight is not fundamental its value depends on circumstances in the universe.

Weight is a force. It is the resultant gravitational force exerted on a body with mass m by all the other bodies on the universe.

$$\text{Weight} = F_g = G m M_e / R^2 = mg$$

Where M_e is the mass of the Earth and R is the radius of Earth.

➤ Weight of the object on Moon:

- The mass of the moon is less than the mass of the earth. So the moon exerts lesser force on the objects than the earth.
- The weight of an object on the moon is one sixth (1/6th) of its weight on the earth.
- The weight of an object on the earth is the force with which the earth attracts the object and the weight of an object on the moon is the force with which the moon attracts the object.

Celestial Body	Mass (kg)	Radius (m)
Earth	5.98×10^{24}	6.37×10^6
Moon	7.36×10^{22}	1.74×10^6

