



Flipping Physics Lecture Notes:
Introduction to the Force of Gravity and Gravitational Mass

The Force of Gravity, F_g is also called Weight, W . The Force of Gravity is the attractive force between exerted on an object by the Earth. The equation for the Force of Gravity is $F_g = mg$.

m in this equation refers to the *gravitational mass* of the object. Gravitational mass is defined as the mass one uses when determining the Force of Gravity acting on an object. Recall that inertial mass is the tendency of an object to resist and change in state of motion. Even though they have very different definitions, gravitational mass and inertial mass are experimentally identical.

The accepted value for the acceleration due to gravity on Earth is: $g_{Earth} = +9.81 \frac{m}{s^2}$

All forces are vectors; therefore the Force of Gravity is also a vector and is *down*.

The dimensions for force can be determined using the Force of Gravity equation:

$$F_g = mg \Rightarrow (kg) \left(\frac{m}{s^2} \right) = \text{Newton}, N \text{ (in SI units)}$$

$$F_g = mg \Rightarrow (\text{slug}) \left(\frac{ft}{s^2} \right) = \text{Pound}, lb \text{ (in English units)}$$