The objective of this assignment is to get ENGL 301 students acquainted with the 3 types of definitions and how to write a proper example of each one. For the purpose of this exercise, I have chosen to define the concept of *weight* in Physics. I will write a parenthetical, sentence, and expanded definition for weight. My target audience is the educated layperson. I will assume that my audience has some familiarity of Math, but no significant knowledge of Physics.

**Parenthetical definition:** A rectangular box has a mass of 100Kg, what is the weight (force exerted by gravity) of the box?

**Sentence definition:** Weight is the force produced by gravity on an object. The magnitude of this force is directly proportional to the mass of the object.

**Expanded definition:** In Physics, weight is defined as the force produced by gravity on a body, which should not be confused with an object’s mass. The latter is a measurement of the *amount* of matter in units of kilograms, while weight quantifies the effect of gravity *on* matter in units of Newtons (hyperphysics, 2016). The mathematical definition for weight ($\vec{w}$) is the product of an object’s mass ($m$) times the acceleration of gravity ($\vec{g}$):

$$\vec{w}=m\* \vec{g}$$

For example, if a man has a mass of 70 Kg, what is his weight?

$$\vec{w}=70Kg\* 9.81m/s^{2}$$

$\vec{w}= $686.7 N

The previous example is very simple. A more realistic application of the weight formula is for calculating the apparent weight of a body. Apparent weight is the sum of weight produced by gravity plus the “false weight” induced by some external acceleration. You may recall this effect from going up and down on elevators:

$\vec{w}\_{apparent}=m\*(\vec{g}+\vec{a}\_{elevator})$

Newton’s third law of motion states that, for every action, there is an equal and opposite reaction (NASA, 2016). On the surface of the Earth, the normal force counteracts weight (Fig. 1).



**Figure 1.** Weight (mg) and normal force (N) acting on a box of mass (m) (wikimedia, 2016).

This fundamental relationship between weight and normal force is what keeps our feet on the ground without breaking through the floor.

**Bibliography:**

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