Mass vs. Weight

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Weight** is the **force of gravity** acting on a mass. Mass is measured in Kilograms (kg) and weight is measured in Newtons (N). You cannot interchange the words mass and weight. They are different!

Weight (*Fg*) is the **force of gravity** acting on an object. Hence measured in Newtons. ***Mass and weight are not the same!***

The variable ***g*** is the acceleration due to gravity. It is approximately **9.8 m/s/s** on the surface of the Earth, but is different on different planets.

Recall from your reading about mass, weight, volume and inertia that *mass is a measure of inertia (resistance to change in motion) and that weight is a measure of the pull of gravity.*

This means that if you travel to the moon where gravity is weaker (1.67 m/s/s) the mass of you will be the same, but the weight in Newtons (N) would be much less.

**Example 1:** Consider an astronaut with a mass of 75 kg. Calculate his weight on the Earth and the Moon.

**Example 2:** A person weighs 220 lbs on Earth. a) Calculate their mass in Kilograms (1kg = 2.2 lbs) b) Calculate their weight in Newtons.

**Example 3:** An object has a weight of 800 N on Earth. Calculate the mass of the person.

Density

* **Mass and Volume are NOT the same!**
* **Denisty relates mass and volume.**

**Volume:** the physical space that an object occupies (cm3, m3, etc.)

**Mass:** is the “stuff” that makes up an object (g, kg, etc.)

**Density:** ratio of an objects mass to its volume (kg/m3, g/cm3, etc.)

**or**