Section 2.2: Difference between Weight and Mass

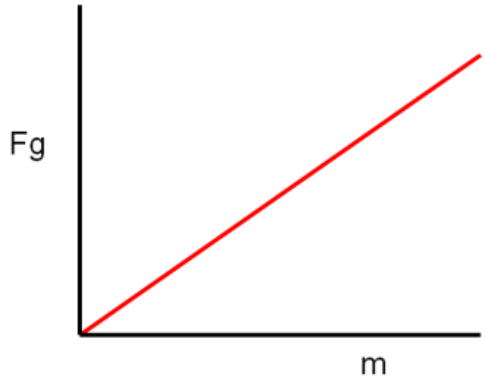
http://www.youtube.com/watch?v=grWG_U4sgS8

Mass

- the quantity of matter (or "stuff") in an object.
- measured using a triple beam balance
- Does not vary with position. Amount is constant
- measured in kilograms

Weight

- is the force of gravity pulling down on an object. For us, weight is caused by the planet earth "pulling down' on us.
- measured using a spring (or weight) scale.
- Varies with position and the force of gravity. E.g. Your weight on the on the moon would be less than on Earth.
- measured in Newtons, in the metric system (not pounds)



$g = Fg/m$
$Fg = mg$
Near the earth's surface, g, the gravitational field strength = 9.81 N/kg

F_g = mg where **F_g** is the weight of the object in Newtons
m is the mass of the object in kg
g is the gravitational field strength in N/kg or m/s^2
On earth, it is 9.8 N/kg or 9.8 m/s^2.

Examples:

1 What is the weight of a 950.0 kg car?

2 A spring balance determines that an unknown mass has a weight of 24.5 N. Find the mass.

3 A 7.50 kg object is placed on a spring scale. If the spring scale reads 78.4 N, what is the acceleration of gravity at that location?

4 A car has a mass of 1200 kg. How much would the car weigh on the moon where the acceleration due to gravity is approximately 1/6 that of Earth's?

5 An astronaut has a weight of 630 N on Saturn where gravity has a value of 10.5 N/kg. What would the astronaut's mass be on earth where gravity has a value of 9.8 N/kg?

6 Mindy has a weight of 539 Newtons on Earth, while on the planet Ork she has a weight of 506 Newtons.

(a) What is the value of gravity on Ork?

(b) Did Mindy loose weight or mass when she travelled from Earth to Ork? EXPLAIN.