

Let's Learn About Gravity and Mass

This activity was created by Kajal.

Did you know that weight and mass are not the exact same thing? Read the information below to learn more and answer the questions that go along with it.

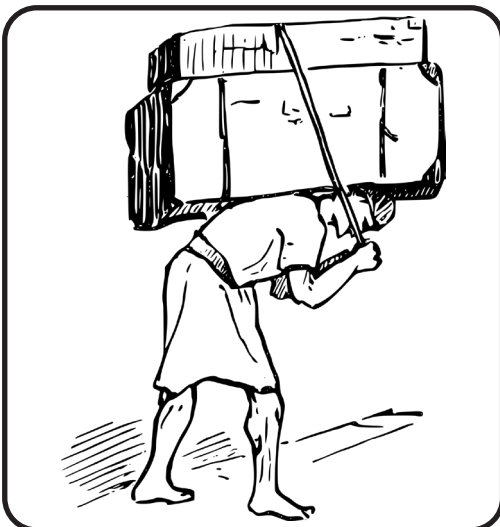
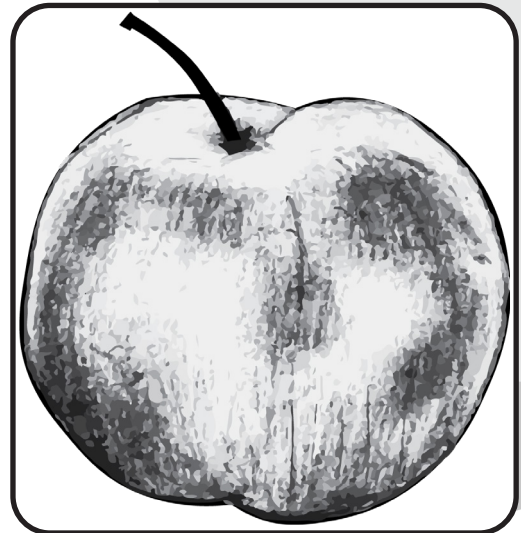


In 1687, Newton shared a revolutionary idea with the world! One day, Newton was sitting under an apple tree when an apple fell on him. This made him wonder why the apple fell down and not up or in any other direction!

Why do you think the apple fell down, not up?

GRAVITY is the force of attraction between two objects. Newton discovered that the strength of the gravitational force depends on the mass of the objects and the distance between them. Objects with a larger mass have a stronger gravitational pull. As the distance between objects decreases the gravitational pull between them gets stronger.

Why did the apple fall down?



On planets, this gravity is the downward **ACCELERATION** of an object (because the planet is the closest and biggest, in terms of mass, thing for all the objects on the planet). This is measured in Newtons.

MASS is the amount of matter in an object.

WEIGHT is the force of gravity on the mass of an object.

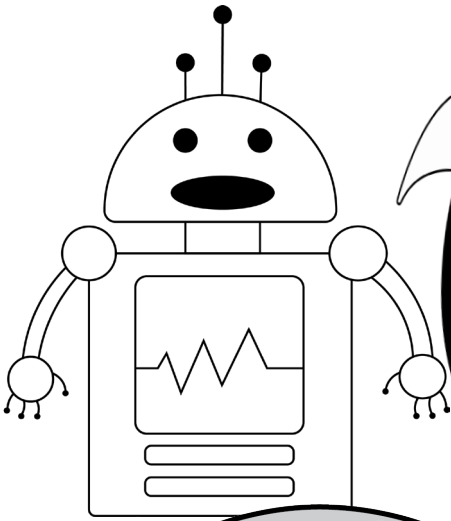
We can calculate weight using the equation :

$$\text{Force} = \text{mass} \times \text{acceleration}$$

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Now that we know more about gravity, mass, weight and acceleration, let's see if we can figure out how weight varies between planets. Since the gravitational pull is different from planet to planet, the weight of the same object will vary on different planets.



Sounds like it is time for some math! I love math, it is such an important part of my coding and what makes me function! So let's calculate the weight of an apple on different planets. For these calculations, the mass of the apple stays the same no matter what (102g), so this is called a constant. The acceleration will change on each planet due to gravity, so this is called a variable.

For example acceleration from gravity, on earth is known to be 9.81m/s^2 . So using the equation $\text{Force} = \text{mass} \times \text{acceleration}$ we can calculate that the force (aka the weight) will be $102\text{g} \times 9.81\text{m/s}^2 = 1000.62$. And force is calculated in Newtons (N) so it will be 1000.62N.

EARTH'S MOON
Acceleration : 1.62 m/s^2

Force =

SATURN
Acceleration : 11.08 m/s^2

Force =

JUPITER
Acceleration : 25.95 m/s^2

Force =