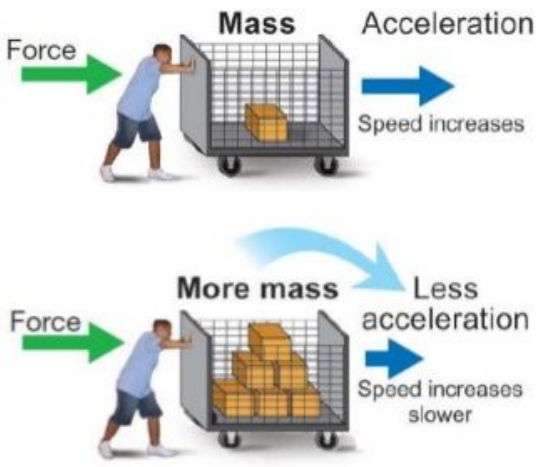
Newton's Second Law

- If the same force is applied to an object with greater mass, the object accelerates at a slower rate because mass adds inertia.



This is why this law has a formula:

$a = \frac{F}{m}$

So if you increase mass then acceleration decreases.

If you decrease mass the acceleration increases.

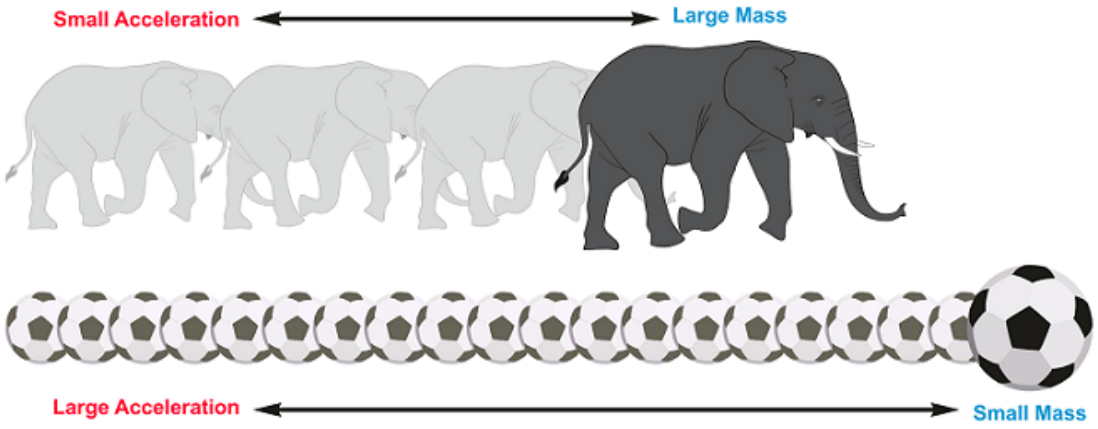
- a is the acceleration that is measured in meters per second squared (m/s^2). It means that if an object accelerates at 1 m/s^2, its speed is increasing by 1 meter per second every second.
- F is a force that is measured in newtons
- m is an object's mass that is measured in kilograms.

Imagine you need to hit two different balls with a baseball bat: one is an ordinary baseball, and the other is heavier and bigger. Since balls have different masses, they will travel different distances and at different speeds when hit with the same force. If you increase the force of hitting, the less heavy ball will fly farther away. So the results will be different anyway.

Newton's Second Law

of Motion

The acceleration of an object as produced by a net force is directly proportional to the magnitude of the net force, in the same direction as the net force, and inversely proportional to the mass of the object.



Force = Mass x Acceleration

F = MA

Newton's 3rd Law Of Motion

If we want to use one word to describe this law, it is Karma. You get back as much as you give, and apparently, it is a physical law and not just a philosophical concept.

Newton's Third Law declares:

For every external force, there is an equal force acting in the opposite direction.

What Newton means by it is that there are always two forces acting on each other at the same time in the opposite directions. And there are no isolated forces — it is a package deal. The first force comes from outside. The second one is the reaction on the first one, which acts back on the object exerting that force. These two forces are always equal, and in the end, they compensate each other.

This is the formula expressing Newton's third law:

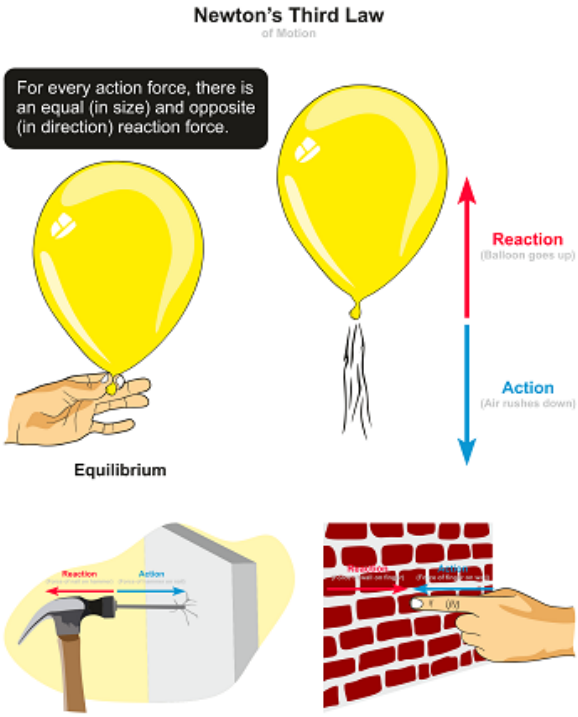
$F1 = -F2$,

where:

F1 – is the force of the first object that acts upon the second object.

F2 – is the force of the second object that acts upon the first object.

You will be surprised to know, but without this physical law, we will not be able to walk on the ground. Each step we make comes with force towards the ground. At the same time, there is a counter-force of the same size coming from the ground and pushing our feet upward. It helps us walk, run and jump.



Example of 3rd law)

The counter-force remains invisible. You probably do not even feel it as we are not used to paying attention to it. But if you know someone who has ever jumped off a tree or other higher ground, you probably heard him complaining about his foot pain afterward. That is exactly the result of the counter-force. If you hit the ground hard, it will hit you back as much. (So don't jump off a tree.) It is the same reason why it hurts when you punch a punching bag, even though it feels quite soft when you just touch it.

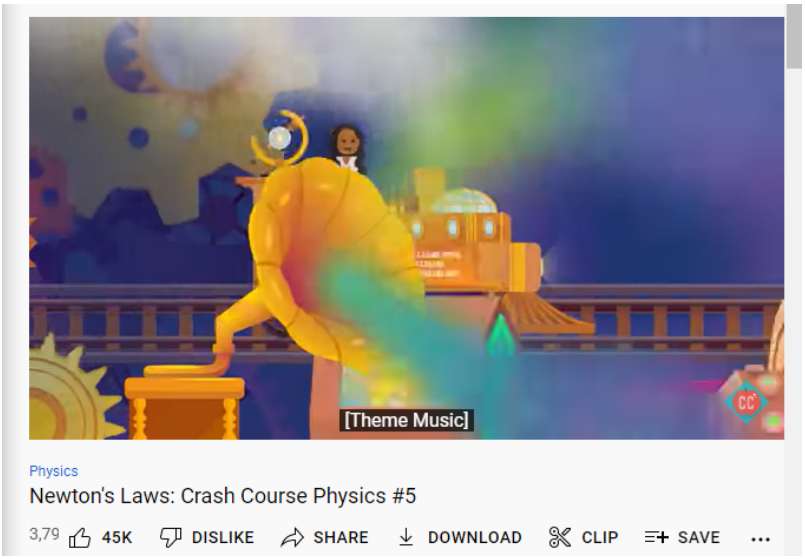
Example

7.2 Newton's Third Law

When the girl jumps to shore, the boat moves backward.

-Playing pool (one ball hits another and makes it move)

Newton's Laws: Crash Course Physics #5 - YouTube



Attachments

BillNyetheScienceGuy - MAGNETISM WS.doc

BillNyetheScienceGuy - ENERGY WS.doc

BillNyetheScienceGuy - GRAVITY Ws.doc