

3 Types of Inertia

1. Inertia of rest: The inability of a body to change by itself its state of rest is called inertia of rest.
2. Inertia of direction: The inability of a body to change by itself its direction of motion.
3. Inertia of motion: The inability of the body to change by itself its state of motion is called inertia of motion.



Why did Calvin, Hobbes and the cart continue to move forward when they fell off the cliff?

<p>All objects have this tendency to oppose any change in motion.</p> <p>A Body with Mass.</p>	<p>If it is stationary, it likes to remain stationary.</p>	<p>If it is moving, it likes to remain moving.</p>
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This tendency is called the inertia of an object.

Inertia is the tendency of an object to remain in its state of rest or constant speed in a straight line.

Imagine a stationary pebble and a stationary large rock. Which do you think is easier for you to move?

<input type="checkbox"/> Stationary pebble 	<input type="checkbox"/> Stationary large rock
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If the pebble and the large rock are both moving, which do you think is easier for you to stop?

<input type="checkbox"/> Moving pebble 	<input type="checkbox"/> Moving large rock
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An object with smaller mass is easier to move and easier to stop. An object of smaller mass has smaller inertia.

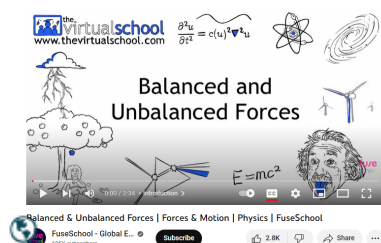
**The inertia of an object depends on its mass.
A bigger mass has greater inertia.**

By Esther

Newton's 2nd Law of Motion

Newton's second law of motion for kids straightforwardly states that the rate of momentum is directly and proportional to the force applied to the object and takes place in the direction in which force is applied.

-add force moves farther



Newton's second law states that when you push an object with more force it will move faster and farther away.

Balanced vs. Unbalanced

- **Balanced forces-** When two or more forces acting on an object are equal in all directions.
 - Results in no movement
- **Unbalanced forces-** When two or more unequal forces act on an object.
 - Moves in the direction with more force.
 - Net force is the difference between these forces.



$$\begin{array}{r} 300 \\ -300 \\ \hline 0\text{N} \end{array}$$

Balanced



$$\begin{array}{r} 400 \\ -300 \\ \hline 100\text{N} \end{array}$$

←

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.



↑ Mass,
Acc ↓

Or
↓ Mass the
Acc ↑

$$F = M \times A$$

This is why this law has a formula:

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

So if you increase mass then acceleration decreases.

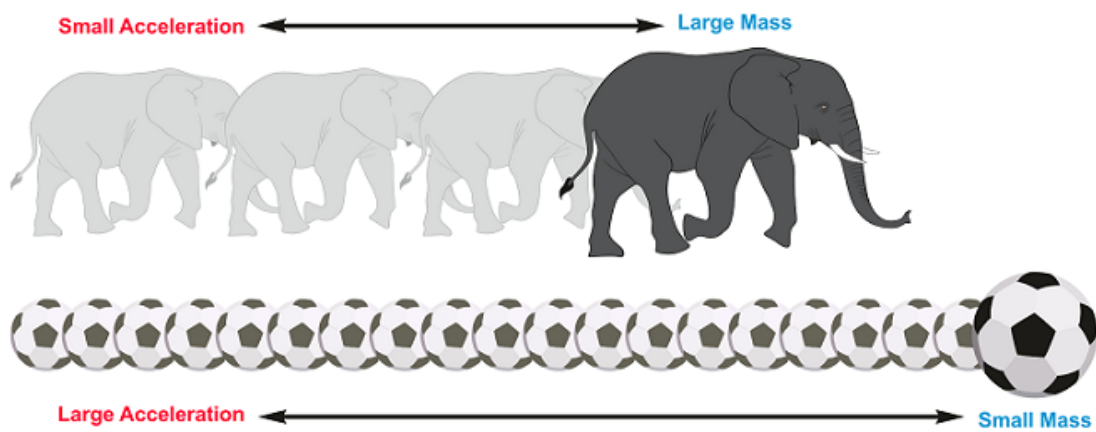
If you decrease mass the acceleration increases.

- > 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:

$$F_1 = -F_2,$$

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.

Attachments

BillNyetheScienceGuy - MAGNETISM WS.doc

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Grade 8 Research Hypothesis Theory Law.docx