M TION & FORCE

FORCE

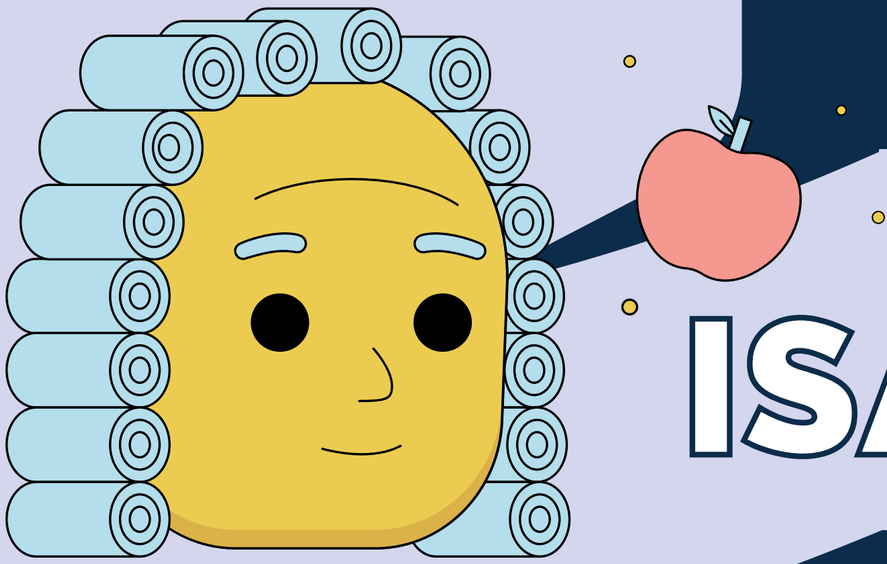
Interaction between two objects that causes a change in the motion of the objects.

What impact can forces have on objects?

- make it move
- make it speed up
- make it slow down
- stop it
- cause it to change direction
- cause it to change shape

?

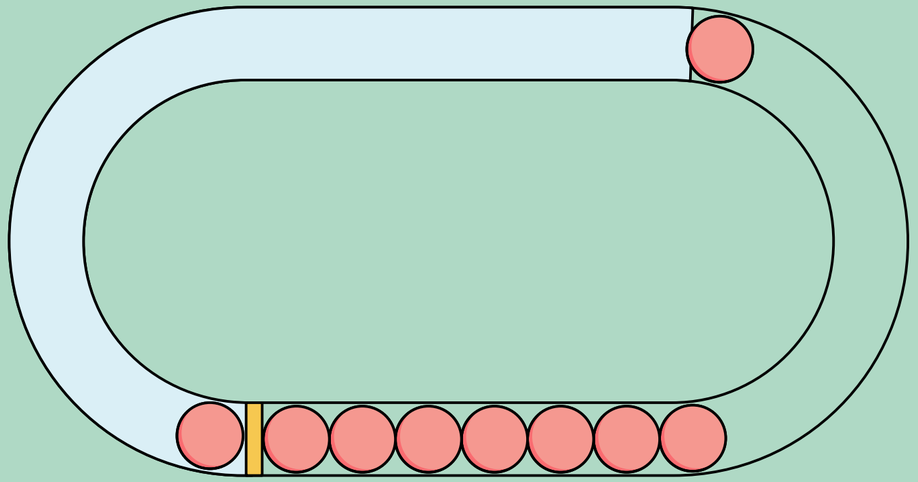
In what way does the mass of an object impact force?



WHO WAS ISAAC NEWTON?

A renowned physicist and mathematician from England who discovered in 1687 the correlation between force and motion. Today, his three laws of motion are instrumental in describing the movement of any object in the universe.

NEWTON'S

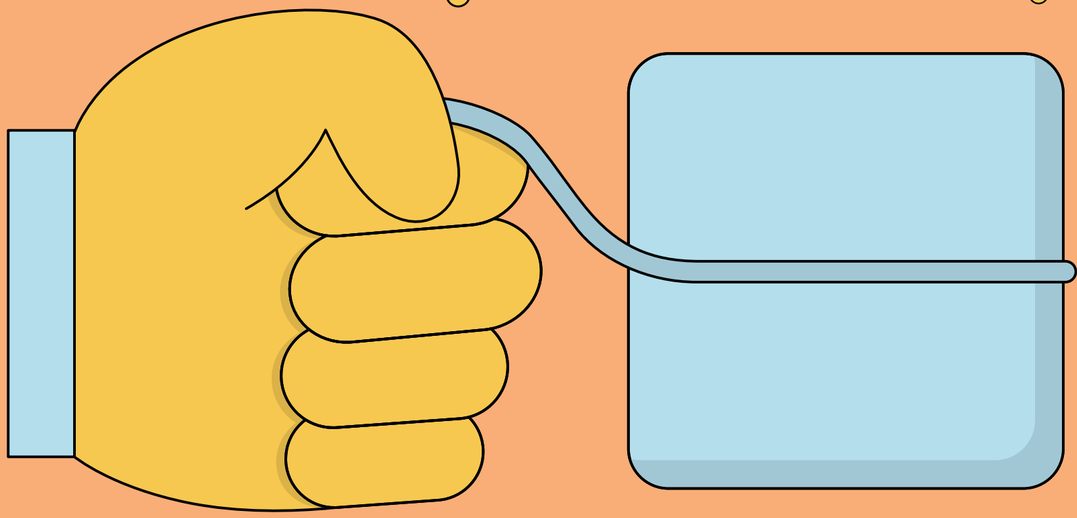


FIRST LAW OF MOTION

States an object at rest will stay at rest unless acted on by an unbalanced force. An object in motion will stay in motion at the same speed and in the same direction unless acted on by an unbalanced force.

NEWTON'S

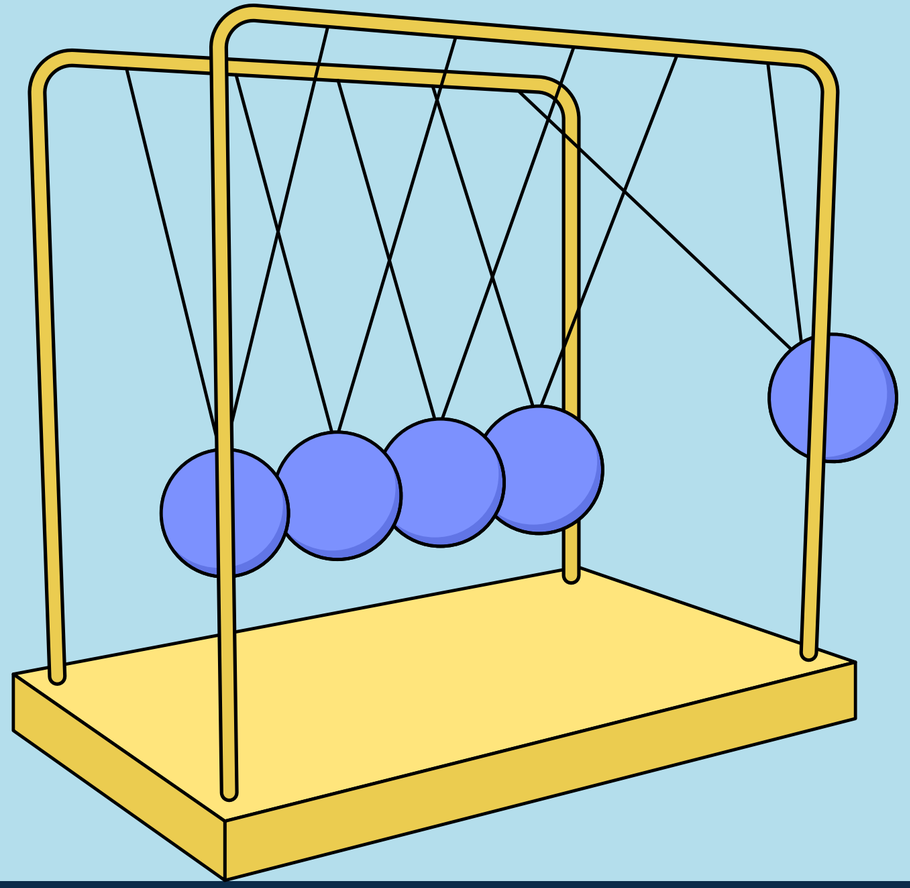
SECOND LAW OF MOTION



States the acceleration of an object by a force is inversely proportional to the mass of the object and directly proportional to the force.

FORCE = MASS • ACCELERATION

States for every action, there is an equal but opposite reaction.



NEWTON'S THIRD LAW OF MOTION

Name instances where Newton's First Law of Motion comes into play.

Can you think of scenarios where Newton's Third Law of Motion is relevant?

?

Provide examples of when Newton's Second Law of Motion is applied.

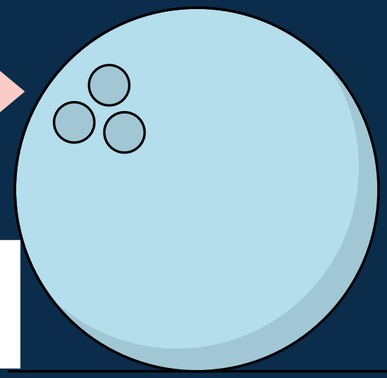
The measure of an object’s resistance to changes in its state of motion due to the application of a force.

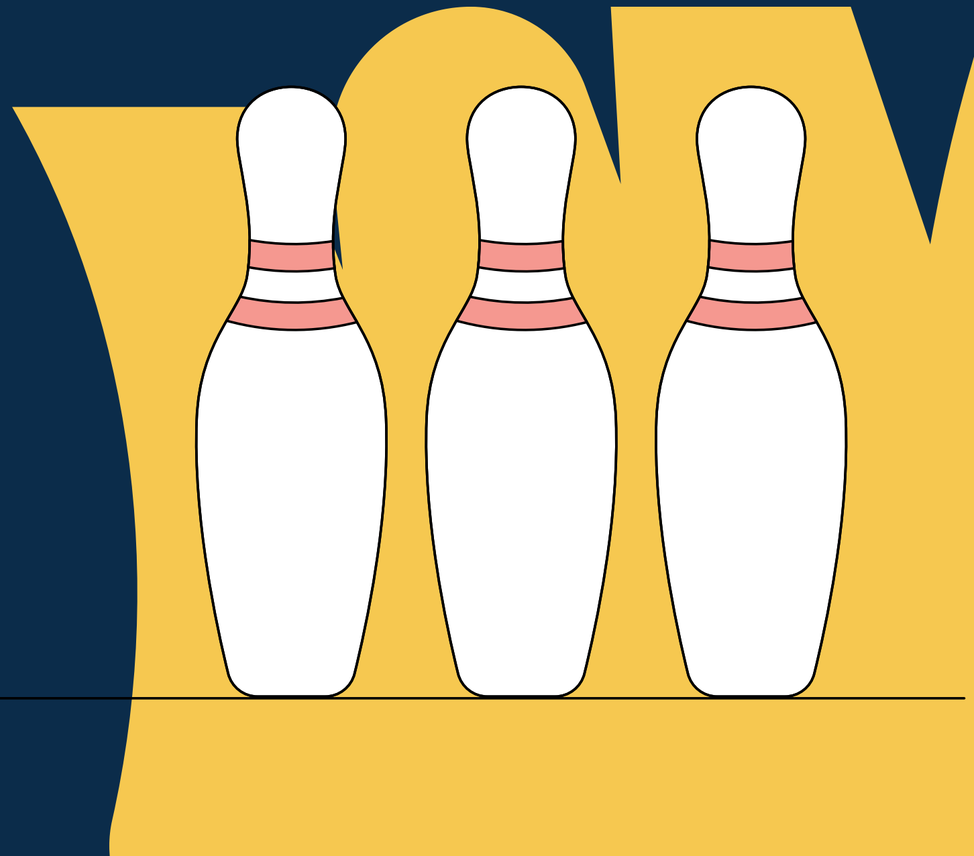
Momentum = mass in motion

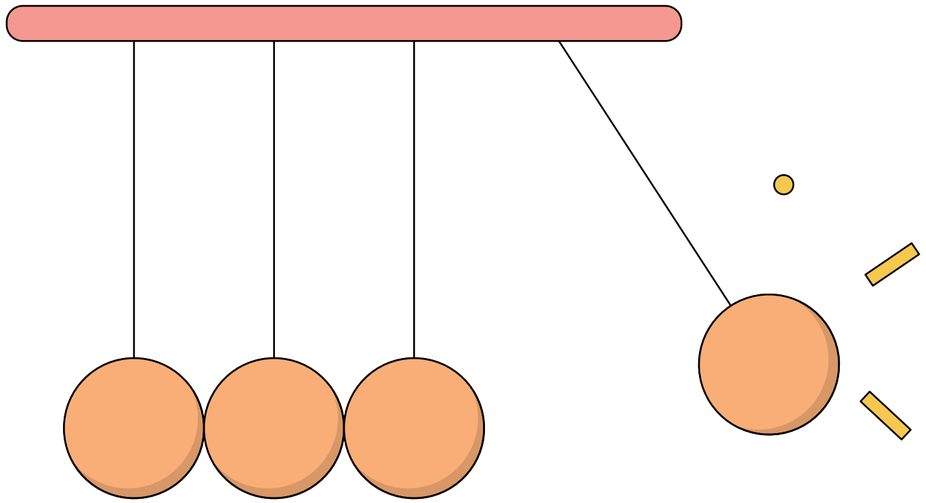
Momentum = mass • velocity

$p = m \cdot v$

MOMENTUM



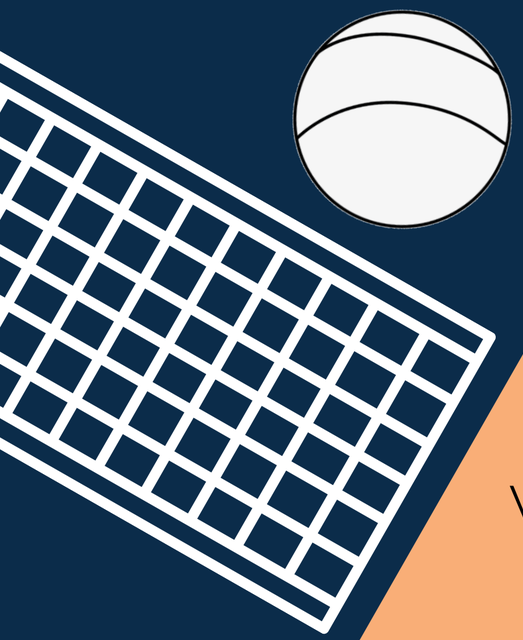




CONSERVATION OF MOMENTUM

A scientific principle that states that the total momentum of a system, or group of objects, remains constant if no external forces act upon it.

- This principle applies to objects in motion.
- It is closely related to Newton's Third Law of Motion which states that for every action, there is an equal and opposite reaction.
- $m_1v_1 + m_2v_2 = (m_1 + m_2)v$

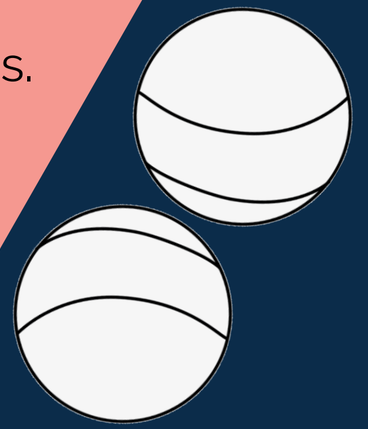


When two objects interact in a single direction, the total momentum of the two objects before the interaction is equal to the total momentum after the interaction.

CONSERVATION OF MOMENTUM IN ONE DIRECTION

CONSERVATION OF MOMENTUM IN TWO DIRECTIONS

If two objects interact in two perpendicular directions, the total momentum of the two objects before the interaction is the same as the total momentum after the interaction in both directions.

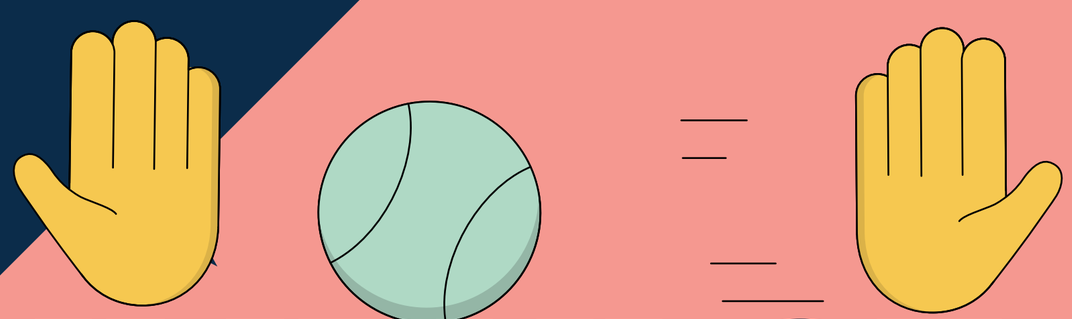


When a force is applied to an object, it will result in a change of momentum. This change may involve a shift in velocity, such as an increase or decrease in speed, or a change in direction.

An impulse causes a momentum change

Impulse = Momentum Change

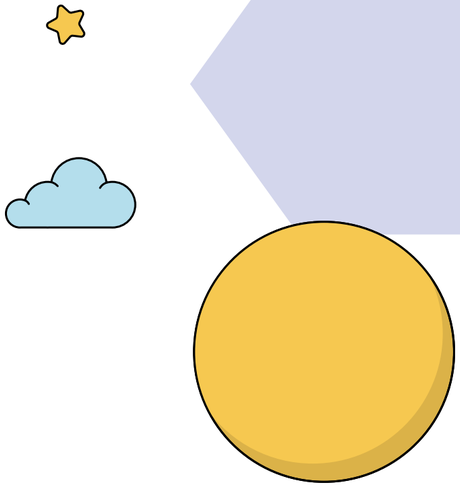
$F \cdot \Delta t = m \cdot \Delta v$



IMPULSE

INERTIA

The tendency of an object to resist a change in motion. This means that an object will either stay at rest or continue moving in a straight line at a constant speed.



The change in the speed or direction of an object's movement.

Acceleration = Change in Velocity / Time

ACCELERATION

CONTACT FORCE

- requires two objects to be in physical contact with one another
- typically caused by physical objects, such as when two objects rub against one another
- typically localized and affects only the two objects that are in contact

Objects can be moved and made to interact with each other through action.

NON-CONTACT FORCE

- acts upon objects without physical contact
- typically caused by energy, such as light, sound, and magnetism
- can affect multiple objects at once

SORT THE FORCE

CONTACT FORCE

NON-CONTACT FORCE

Test Review

April 25th @ 2:45 pm

April 27th @ 2:45 pm

Schedule

- April 3rd - Presentation
- April 6th - Demo/Lab
- April 12th - Science Stations
- April 17th - Notes Check
- April 20th - Review HW
- April 28th - Unit Test