

# Inertia and Momentum

## Leading questions:

- What do you have to do to put a stationary object in motion?
- Is it easier to stop a moving heavy object or a lighter one?

## What to do:

1. Roll an empty cart back and forth a short distance on the table.
2. Now put a metal block in the cart and try again.
  - Which one is easier to start moving? Why?
  - Which one is more difficult to stop? Can you explain why?

**Explain:** It takes a greater force to either start or stop a cart that has more mass, than one that has less mass.
3. Collide various combinations of marbles of different masses on a track.
  - Explain what you discover.

**Explain:** Objects with less mass will always move further and faster when struck by objects of more mass. This property that keeps an object in motion is called **momentum**. In any collision, **momentum is conserved**, passed from one object to another.
4. Now, roll different size marbles down a track to collide with an empty cart.
  - What happens when the marble hits the cart, which is at rest?

**Explain:** momentum is transferred from the marble to the cart causing it to move.

  - Try using a marble with more mass.
  - Try adding more mass to the cart.
  - What do you discover?

**Explain:** More mass transfers more momentum; more mass has more inertia.

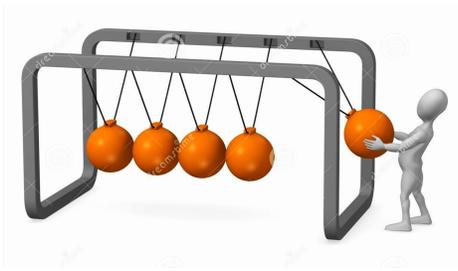
## Summary:

Any object has a property known as **inertia**. Inertia is the resistance of an object to a change in its position (or its current motion). This is **Newton's First Law**.

- What properties of an object do you think affect its inertia?

Objects already in motion have **momentum**. Momentum is the tendency of a moving object to keep moving.

- What properties of an object do you think affect its momentum?
- Experiment with Newton's Cradle and try to explain what "**conservation of momentum**" means.



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Any object has a property known as **inertia**. Inertia is the resistance of an object to a change in its position (or its current motion). This is **Newton's First Law**.

- What properties of an object do you think affect its **inertia**?

Objects already in motion have **momentum**. Momentum is the tendency of a moving object to keep moving.

- What properties of an object do you think affect its **momentum**?
- Experiment with Newton's Cradle and see if you can figure out what "**conservation of momentum**" means.