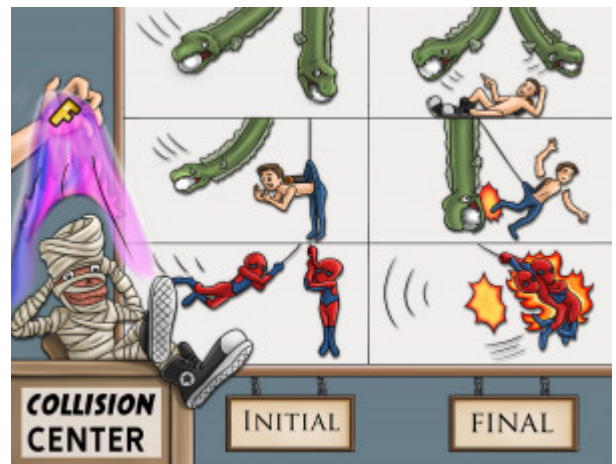


Collisions

Collisions are a common way to test understanding of momentum in physics. The momentum of an object is its mass multiplied by its velocity. There are three types of collisions: perfectly elastic, perfectly inelastic, and partially inelastic. In all collisions, momentum is conserved without external forces. However, total kinetic energy is only conserved in perfectly elastic collisions. In fully and partially inelastic collisions, the initial total kinetic energy is greater than the final total kinetic energy. This is because some of the energy in the collision is released, typically as sound or heat. For example, the fact that we can hear car crashes occurring indicates that some of the kinetic energy initially present in the reaction was converted. In fully inelastic collisions, the two objects stick together and their final momentum (which is still conserved) is the velocity of the combined objects multiplied by their masses added together.



PLAY PICMONIC

Momentum is conserved without external forces

[Mummy in Converse Unaffected by Force-Hand](#)

Momentum is Conserved Without External Forces

Elastic Collisions

[Elastic-Eel Collisions](#)

Elastic collisions are typically visualized by two perfectly elastic rubber balls bouncing off each other. Energy and momentum are conserved in elastic collisions.

Total Kinetic Energy Conserved

[Ken-Battery in Converse](#)

In an elastic collision, total kinetic energy is conserved. Two perfectly elastic rubber balls bouncing off each other lose no energy in the process. This means that they continue with the same kinetic energy but are likely moving in a different direction than they originally were.

Partial Inelastic Collisions

[Elastic-Eel causing Collision with Partial In-Elastics Ken--Battery](#)

Partially inelastic collisions describe the vast majority of collisions that occur. In these collisions, two objects do not bounce off each other perfectly. They do lose some energy in the process, but momentum is still conserved.

Initial Kinetic Energy > Final Kinetic Energy

[Final Ken-Battery missing peices](#)

Partially inelastic collisions are defined by the fact that the total initial kinetic energy of the objects involved is greater than the total final kinetic energy. This is because some of the energy was released.

Fully Inelastic Collisions

[In-Elastics-Men Colliding](#)

A fully inelastic collision occurs when two objects stick together after a collision. In this case, while momentum is still conserved the equation for final momentum changes. The final momentum is the velocity of the combined objects multiplied by the added mass of the two objects.

Energy Released as Sound or Heat

Flames and Soundwaves at Collision

Energy given off is typically in the form of sound or heat. The fact that car crashes are audible indicates that some energy is lost. If two people "high-five", the kinetic energy of the moving hands is converted to sound and heat.