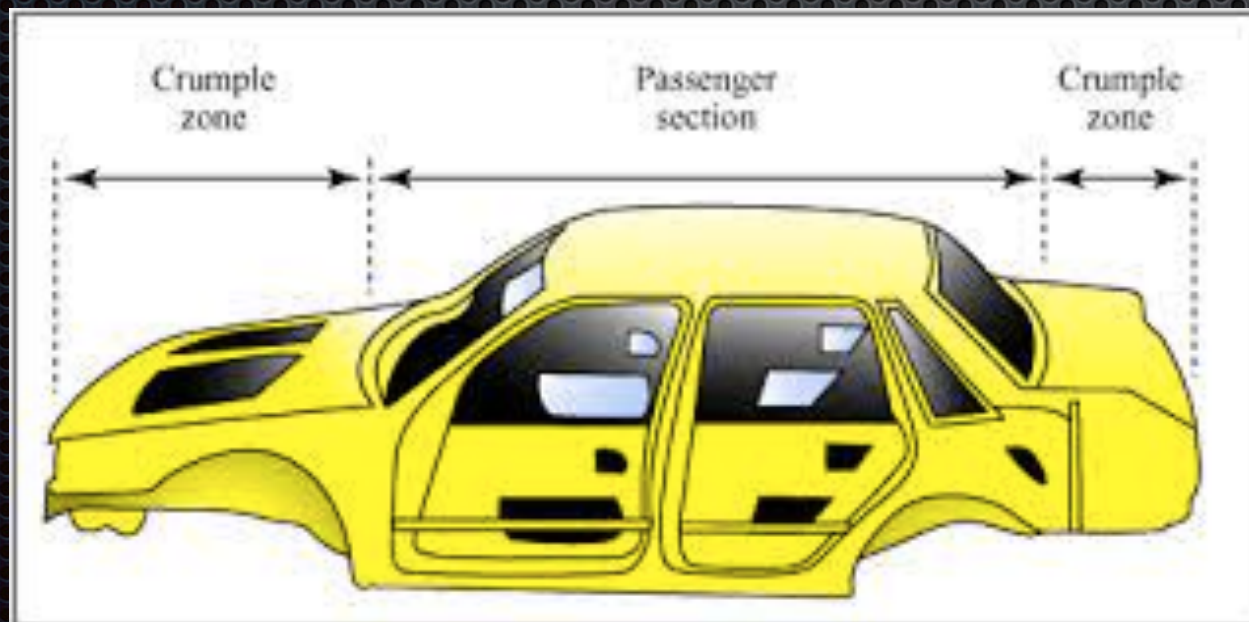


Modern cars vs cars in the 1950s

Principle A — crumple zones

Crumple zones in cars are the areas in-front and behind of where the passengers sit (see bottom left corner for diagram). They are designed for in the case of a crash to crumple easily to absorb the force of the impacts. The Kinetic energy from the car moving gets absorbed by the crumple zone into controlled deformation on impact.



Formula

$$\Delta p = F \Delta t$$

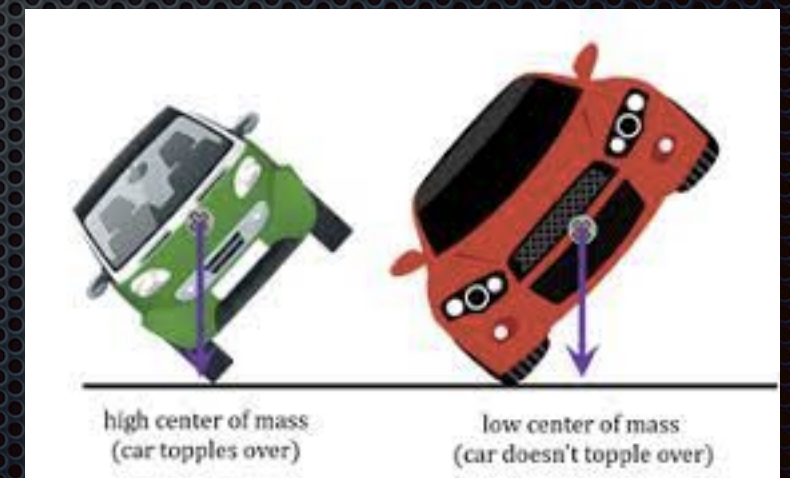
Δp = Change in momentum

F = applied force

Δt = elapsed time

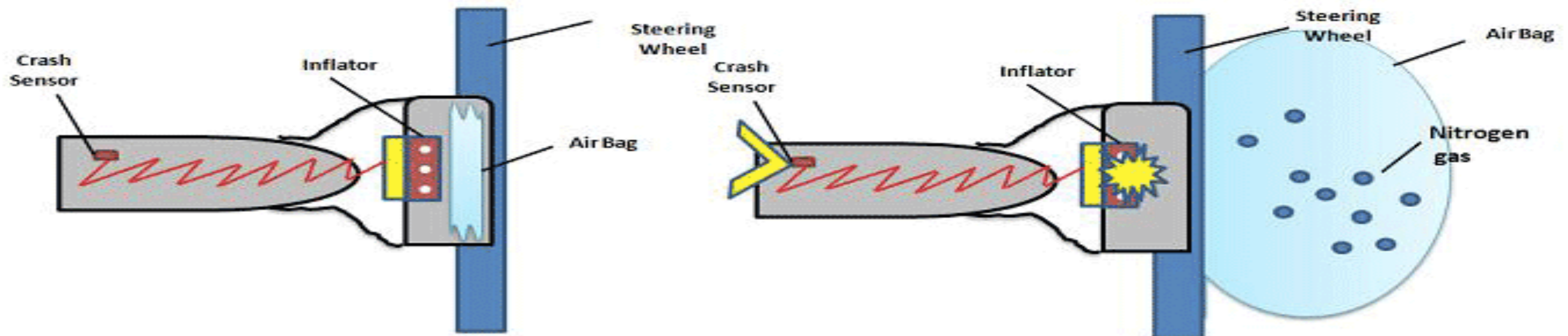
Principle B - spreading the forces of impact over the largest possible area and ensure the stability of the car

- ✦ In car crashes all the force from the impact has to go somewhere, crumple zones play a vital role in this as cars are built with 'crumple zones' to use up some of the force for the impact which leaves less force to affect the driver.
- ✦ Stability in a car is an important thing as it can prevent many issues that can occur such as spinning out or getting in a car crash. Having a lower centre of gravity contributes to a cars stability as it reduces weight transfer during braking or going around corners which can help prevent rolling the car.



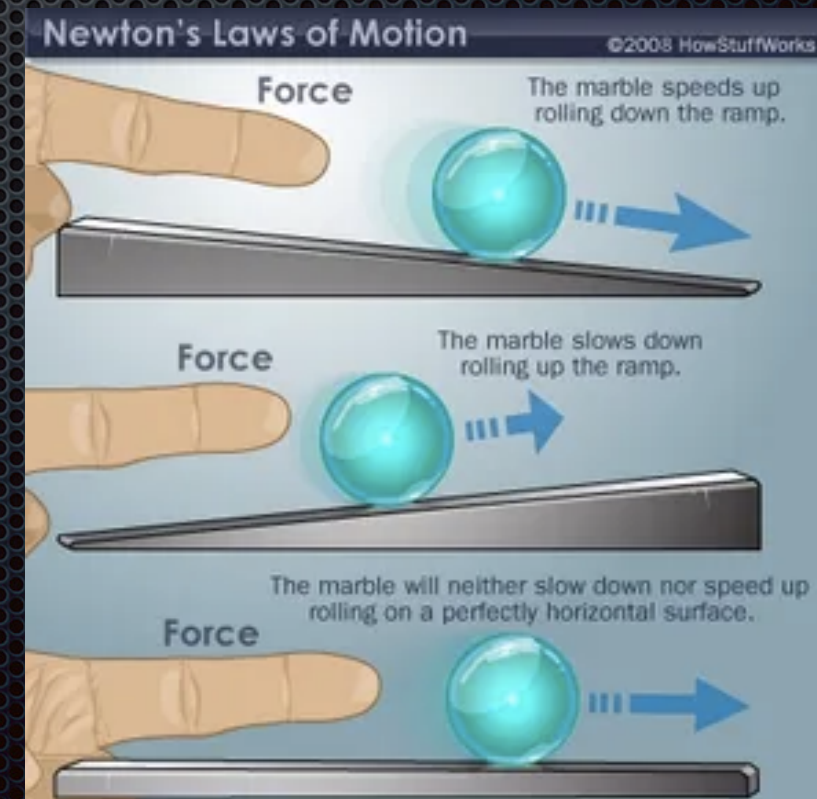
Principle C - stopping the transfer of energy

- Seatbelt and airbags are a great way to stop or reduce the transfer of energy. When the airbags go off they inflate into a soft cushion which is between the occupants and the windshield and absorbs most of the energy from the impact which protects the occupants.
- Since work is force multiplied by distance, the work done on you from the collision is much less seeing as you and the airbag is much closer than you and the windshield.



Principle D - law of inertia

- Newton's 1st law states that "every object will remain at rest or in uniform motion in a straight line unless compelled to change its state by the action of an external force." Having a seatbelt in a car is a force which will hold you back from flying through the windshield and protects the occupants from serious injury. If there was no seatbelt according to the law of inertia the person would remain in motion until the force from the windshield stops or slows down the person.



Modern car safety features - Tesla

- Teslas are one of the safest cars in the world they possess top tier safety features such as a low centre of gravity to prevent rolling, seatbelts to prevent people from flying out the window, airbags to lessen the transfer of energy, has large crumple zones at the front and rear of the vehicle they also have mirrors and cameras to help the driver see 360° around the car.

old car - 1940 cadillac

- ✦ Cars in history haven't been very safe but every year they are becoming safer. in the 1940s cadillacs were a popular car but weren't very safe. They didn't possess any airbags to absorb the force of impact and only had seatbelt around the lap which was dangerous

