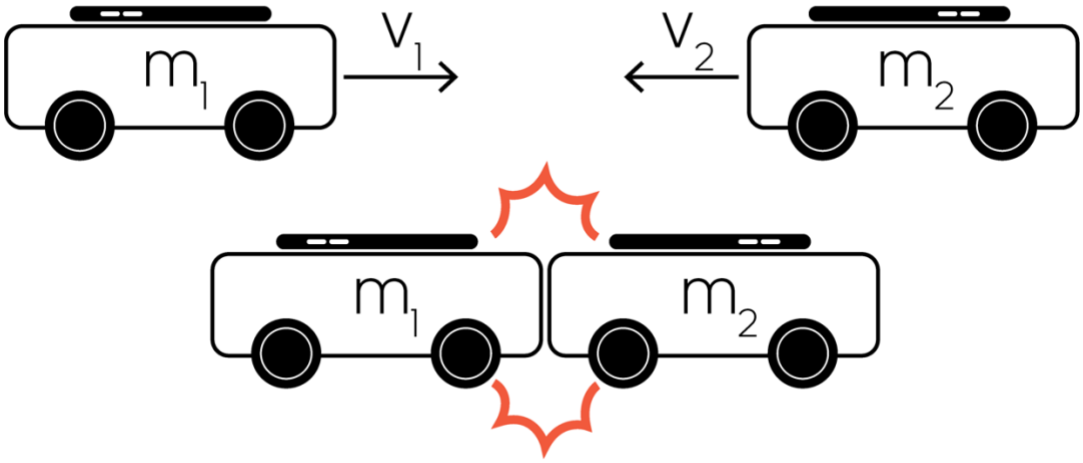
Impact upon Collision



Theory

	Definition	Unit
Mass m	The "amount" of matter	Kilogram (kg)
Acceleration a	Rate of velocity change of object over time	Meter per second square (ms^{-2})
Velocity v	Rate of displacement change of object over time	Meter per second (ms^{-1})
Displacement d	End-to-end distance of motion of object	Meter (m)

Newton's Second Law states that force $F = ma$; Newton's Third Law states that whenever Object A acts an action force on Object B, Object B must spontaneously be applying a "reaction force" on Object A with **equal magnitude but in opposite direction**.

Activity

Fix two phones on two separate cart. Launch "Accelerometer" in "AP-Sensor" app. Press "Start" then lightly push both carts towards each other for head-on collision. Observe the acceleration when the carts collides. Besides, you may repeat the experiment with soft impact such as cushion or mat, in order to compare the collision between soft and hard objects.

Experimental Result

	Phone and Cart (1)	**Phone and Cart (2)**
Mass m		
Collision Acceleration a		
Impact Force F = ma		

Discussion

1. The accelerometer can measurement acceleration in 3 axes. Can you find the x-, y- and z-axis of the phone and their positive directions when it is randomly moved?
2. What is the relationship between the impact force observed on both carts?