0.1 Unit 03 - Forces

1 **Definition** (Force)
Any interaction between any two objects.

2 **Definition** (Fundamental Forces)
Fundamental forces:

- Gravitational force - by far the weakest force.
- Electromagnetic force - the fundamental force that dictates 98% of forces you experience on an everyday basis. Holds together molecules. Ex. rub a balloon on your head.
  - People are mostly made up of empty space.
  - Why do you feel the desk? Photon-photon interactions.
- Strong Nuclear Force - since atoms are all charged positively in the nucleus and should theoretically repel each other, they still stick together because of strong nuclear force.
  - Strongest force. Only works over small distances.
  - Making these using $E = mc^2$ then it can easily turn into a nuclear reaction.
  - To make a nuclear fusion reaction, two atoms must collide with large amounts of energy.
- Weak Nuclear Force - underlies radioactivity and decay
  - The effective range of the weak force is limited to subatomic distances, and is less than the diameter of a proton.

Newton's Three Forces

- An object at rest stays at rest and an object in motion stays in motion with the same speed and in the same direction unless acted upon by an unbalanced force.