Example: Coulomb Force

Two paperclips are separated by 3 meters. Then you remove 1 electron from each atom on the first paperclip and place it on the second one.

$$\vec{F} = k\frac{q_1 q_2}{r_{12}^2}\hat{r}_{12}$$

$k = 9 \times 10^9 \text{ N m}^2 / \text{C}^2$

electron charge $= 1.6 \times 10^{-19}$ Coulombs

$N_A = 6.02 \times 10^{23}$

Which weight is closest to the approximate force between those paperclips (recall that weight = mg, g = 9.8 m/s^2)?

Balloon demo

A) Paperclip (1 g x g)

B) Text book (1 kg x g)

C) Truck (10^4 kg x g)

D) Aircraft carrier (10^8 kg x g)

E) Mt. Everest (10^{14} kg x g)