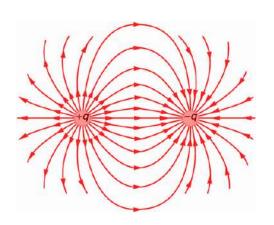
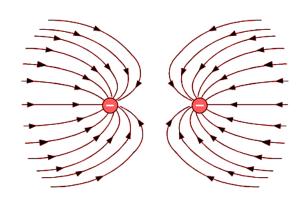
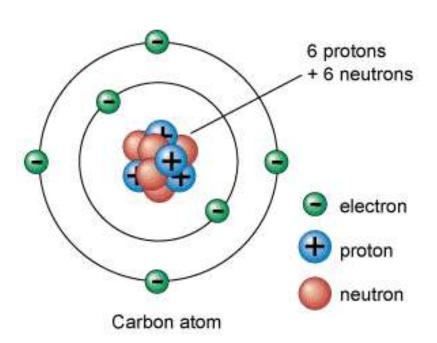
Electric Charges



Flipped Lesson



Set up of the atom



Only the electron is free to move about and jump from object to object.

Elementary Charge, e

All electrons have exactly the same charge. Protons also have a charge of the same magnitude, but with an opposite sign.

Magnitude of an Electron's Charge, e

$$e = 1.60 \times 10^{-19} \,\mathrm{C}$$

SI unit: coulomb, C

$$Q = ne$$

Q = Total charge

n = Number of electrons or protons

e = Charge of 1 electron or proton

Example

1. Find the net charge of a system consisting of 4.1x10⁻⁷ electrons.

1. If a piece of tape has a charge of 1.328x10⁻¹⁷ C, how many electrons are on the piece of tape?

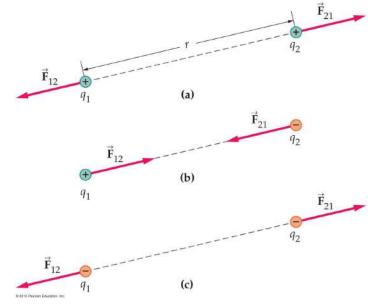
Electric Force

Coulomb's Law gives the force between two charged objects:

$$F = k \frac{|q_1||q_2|}{r^2}$$

SI unit: newton, N

$$k = 8.99 \times 10^9 \,\mathrm{N} \cdot \mathrm{m}^2/\mathrm{C}^2$$



Example

A charge $q1 = -5.4x10^{-6}$ Coulombs is at the origin, and a charge $q2 = -2.2x10^{-6}$ Coulombs is on the x-axis at x=1 meter.

1. Find the electric force between the two charges.

1. Is the force attractive or repulsive?