Tuesday Reading Assessment: Unit 0, Coulomb's Law and E-fields

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1 Memory Bank

- $\vec{F}_{12} = kq_1q_2/r^2 \ \ \hat{r}$ ... Coulomb force.
- $k = 8.988 \times 10^9$ N C^{-2} m^2 ... The constant of proportionality in Coulomb force.
- $\vec{F} = q\vec{E}$ ... Definition of an electric field.
- $1e = -1.602 \times 10^{-19}$ Coulombs ... Charge of an electron.
- $1p = +1.602 \times 10^{-19}$ Coulombs ... Charge of a proton.

2 Coulomb Force

1. Suppose you have a charge of +1 nC, or 10^{-9} Coulombs, separated from another identical charge. (a) What will be the force between them? (b) Will the charges accelerate toward each other or away from each other?

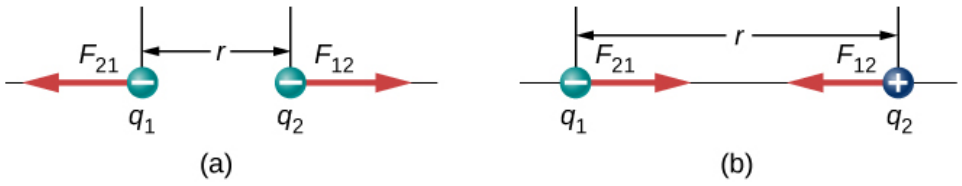

Figure 1: With the Coulomb force, like charges repel each other, and opposite charges attract.

2. How many protons are required to create a *total charge* of +1 nC, or 10^{-9} Coulombs?

3. If two charges are a distance r apart, and then r is tripled, by what factor does the force decrease?
   - A: 3
   - B: 6
   - C: 9
   - D: 12