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Conduction vs Insulation

- Charge can flow through or over the surface of conductors:
  - Metals, graphite, plasma
- Insulators do not allow charge to flow along or through them.

Transferred and Induced Charges

- Charge can jump from a charged object to an uncharged object, sometimes through insulators depending on voltage.
- A charged object can induce a temporary charge **migration** in an uncharged object, but the entire object is still neutral.

Coulomb's Law

$F\vec{F} = \frac{1}{4\pi\epsilon_0}\left(\frac{q_1 q_2}{r^2}\right) = k\frac{q_1 q_2}{r^2}$

$k = 8.99_{x10^5}\frac{Nm^2}{C^2}$

Variable	Units	Description
q_1, q_2	Coulomb (C)	The charge of each particle
r	Meters (m)	Distance between centers of charges

ϵ_0 and k are different ways of representing the constant.

Signs

Be very careful with signs:

If $\vec{F} < 0$, charges repel each other.

If $\vec{F} > 0$, charges attract each other.