Coulomb's Law

$$F_{C_{12}} = k \frac{q_1 q_2}{r^2}$$

Newton's 2nd Law

Newton's 3rd Law

Action at a distance

Superposition

If there are more than two charges the core question is how to determine the force on a given charge.

makes the "problem" into a vector problem which brings all of that vector stuff (good and bad) along for a ride.

Basic Charge Ideas

Particularly the "3rd grade" rule!

Concepts and Skills from Newtonian Mechanics

the concepts and skills from first term physics are presumed to be relatively close to the surface of your mind including vector skills, kinematics, graphing and plotting interpretations, freebody diagrams, energy tools and concepts, momentum, torque, center of mass, etc etc etc......ain't it great!

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Coulomb's Law

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Newton's 3rd Law

the magnitude of the force on charge 2 from charge 1 is the same as the magnitude of the force on charge 1 from charge 2 -- since all physical contact is, at its root, a coulomb force from one atom on another then Newton's 3rd Law is a consequence of Coulomb forces.

Newton's 2nd Law

Coulomb forces are just another non- contact force (like gravity) to put on the freebody diagram you are anxious to do for your physics problems:)

Action at a distance

This is a fundamental philosophic problem. HOW do the charges "know" to feel the force from each other? How long does it take for one charge to notice that the other has moved....is it instantaneous? Same problem exists for the gravitational force and any other non-contact forces.......hmmmm

Philosophically:

Why is the specific character of the interaction between a pair of charges (Coulomb's Force) NOT affected by the presence of other nearby charges?

Counter Example: You are talking to your romantic interest having a great interaction and your parental unit walks up and joins the conversation. You would be an unusual person if the character of your interaction did not change. Why are charges different? ...gravity too.

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experimentally it can be demonstrated that the force on a given charge is the vector sum of the forces between each pair of charges -- it can get complicated fast:)