Coulomb Force Gizmo Answers

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Coulomb force, attraction or repulsion of particles or objects because of their electric charge. One of the basic forces in nature, it was discovered by Charles-Augustin de Coulomb, who in 1785 published the results of an experimental investigation into the correct magnitude of electrical forces. These forces are described by Coulomb's Law. The problems are meant to ensure students can use and manipulate Coulomb's Law to solve for force, charge distance or the magnitude of electric charge. Three of the four problems are straightforward applications of Coulomb's Law and have only two charges present in each situation.

Coulomb's Law The electrostatic forces which you observed in Lab I were studied in detail by Coulomb in 1784. His experiments showed that each charged object exerts on each of the other forces that depend on the magnitudes of the charges, q_i and q_o, as well as the square of the distance between them. The magnitude of the electrostatic force depends on the magnitudes of the charges, their distance apart, and the vacuum.

Graphing Coulomb's Force Activity

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The electrostatic force (F) between two point charges q_i and q_o separated by a distance r is given by the equation:

F = k \frac{q_i q_o}{r^2}

where:

- F is the magnitude of the electrostatic force between the charges;
- k is Coulomb's constant, equal to 8.99 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2;
- q_i and q_o are the magnitudes of the charges in coulombs;
- r is the distance between the charges in meters.

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