Coulomb's Law

Name _____

Period _____

DIRECTIONS: Solve the following problems. Show your work. All numbers labeled!

1. When sugar is poured, the rubbing of sugar grains creates a static electric charge that repels the grains and causes sugar to go flying out in all directions. If two sugar grains each acquire a charge of 3.0×10^{-11} C at a separation of 8.0×10^{-5} m, with what force will they repel each other?

2. Boppo the clown carries two balloons which rub against a circus elephant causing the charges to separate. Each balloon acquires 2.0×10^{-7} C of charge. How large is the electric force between them when they are separated by a distance of 0.50 m?

3. Inez sprays her aersol hairspray onto her hair each morning but never notices that one of the reasons that the spray spreads out before reaching her hair is due to the electrostatic charge on the hairspray droplets. If two drops of hairspray repel each other with a force of 9.0×10^{-9} N at a distance of 0.0070 m, what is the charge on each of the equally charged drops of hairspray?

4. Hellen is dusting the house and causes a cloud of dust particles to ascend into the air as she wipes across a table. If two 4.0×10^{-14} C pieces of dust exert an electrostatic force of 2.0×10^{-12} N on each other, how far apart are the dust particles at that time?

5. Two hot air balloons each acquire a charge of 3.0×10^{-5} C on their surfaces as they travel through the air. How far apart are the balloons if the electrostatic force between them is 6.1×10^{-2} N?

Electric Fields & Potential

Name _____

Period _____

DIRECTIONS: Solve the following problems. Show your work. All numbers labeled!

1. Mr. Newitt is photocopying lab sheets for physics class. A particle of toner is carrying a charge of 4.0×10^{-9} C in the copying machine experiences an electric field of 1.2×10^{6} N/C as it's pulled toward the paper. What is the electric force acting on the toner particle?

2. As Mr. Newitt switches on the TV set to catch the weather, the electron beam in the TV tube is steered across the screen by the field between two charged plates. If the electron experiences a force of 3.0×10^{-6} N, how large is the field between the deflection plates?

3. The night custodian dusts off the globe of the Van de Graaff generator with a feather duster, causing the globe to acquire a charge of -8.0×10^{-9} C. What is the magnitude and direction of the electric field at the center of the charged globe?

4. Clark recharges his dead 12.0 V car battery by sending 28,000 C of charge through the terminals. How much electric potential energy must he store in the car battery to make it fully charged?

5. If an electron loses 1.4×10^{-15} J of energy in traveling from the cathode to the screen of Mr. Newitt's personal computer, across what potential difference must it travel?