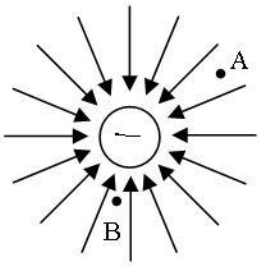
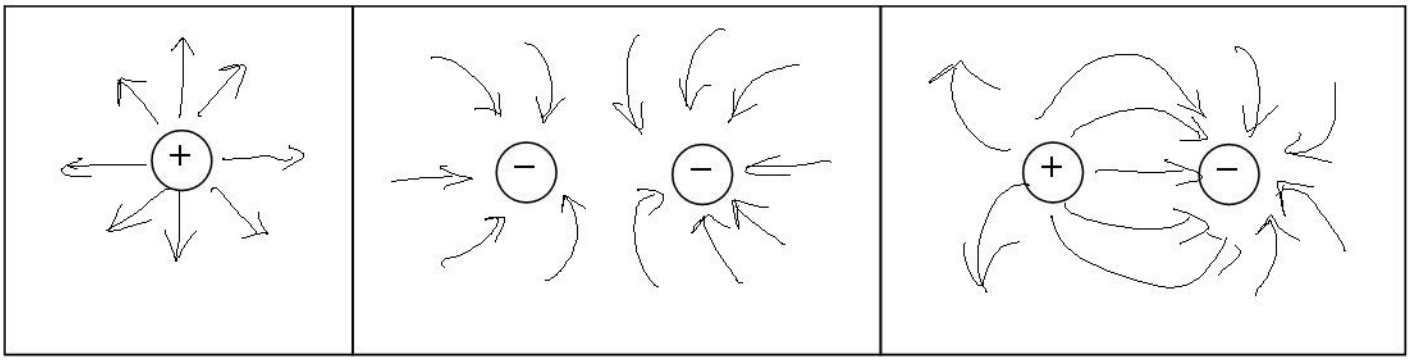
Electric Fields

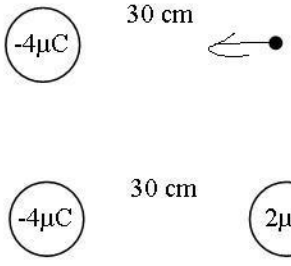
1. Electric field lines point the direction a positive charge would move. Positive charges move away from positive charges and toward negative charges. So, electric field lines point away from positive charges and toward negative charges.



2. A. Is this a + or − charge?
   B. Why? Es point dir. at + charge moves
   C. Is the field stronger at point A or at point B? B
   D. Why? close
   E. How would the picture change if the amount of charge decreased?
   less lines

3. Draw the electric field around the following.





4. A. Calculate the magnitude of the electric field at a point 30 cm away from a –4μC charge.

$$E = k_c \frac{(4\times10^{-6})}{(.3)^2} = 4\times10^5 \text{ N/C} \quad \text{or } 40{,}000 \text{ N/C}$$

   B. What draw the direction of the field at that point. toward the neg.
   C. What is the magnitude of E if a 2μC charge is put at that point?
   same (about position only)
   D. Calculate the force between them.

$$4\times10^5 \frac{N}{C}\left(2\times10^{-6} C\right) = 8\times10^3 N$$

5. Two charges create the electric fields shown at the right.
   A. What are the signs of the two charges?
   B. If they are equal distance from the point, how can the electric field be greater by one of the charges?
   neg charge is bigger
   C. Calculate the net electric field at the point (*magnitude and direction*). 152 N/C at 34.7°
   D. If a 2C charge is placed there, what force will it feel?
   $(152 N/C)(2C) = 304 N$ at 34.7°
   E. Challenge: How much charge causes the 100 N/C electric field?

$$E = k_c \frac{q}{r^2} \quad \text{so} \quad q = \frac{Er^2}{k_c} = \frac{100(.1)^2}{9\times10^9} = 1.1\times10^{-10} C$$