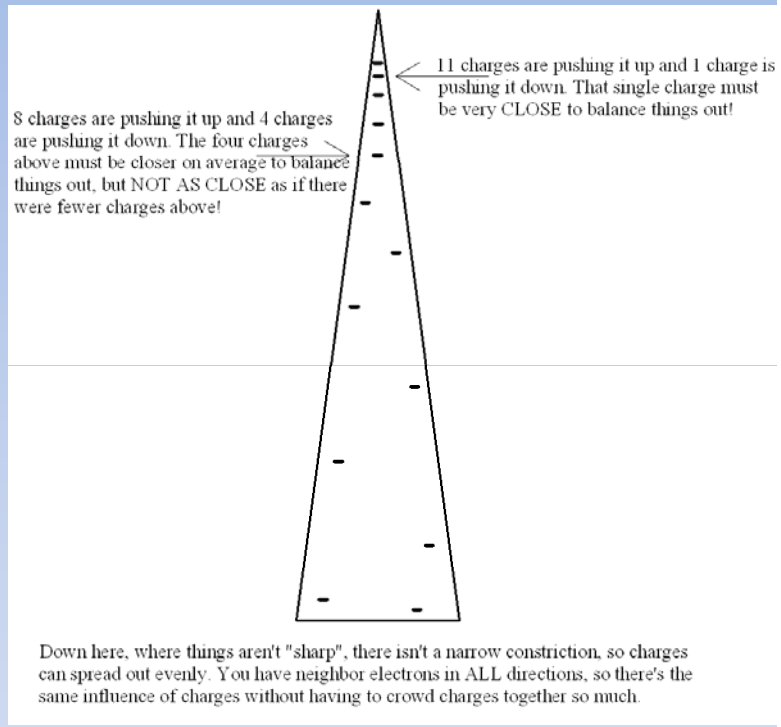
Traditional: 08-04
Themed: 05-06

Electric Fields & Coulomb's law practice

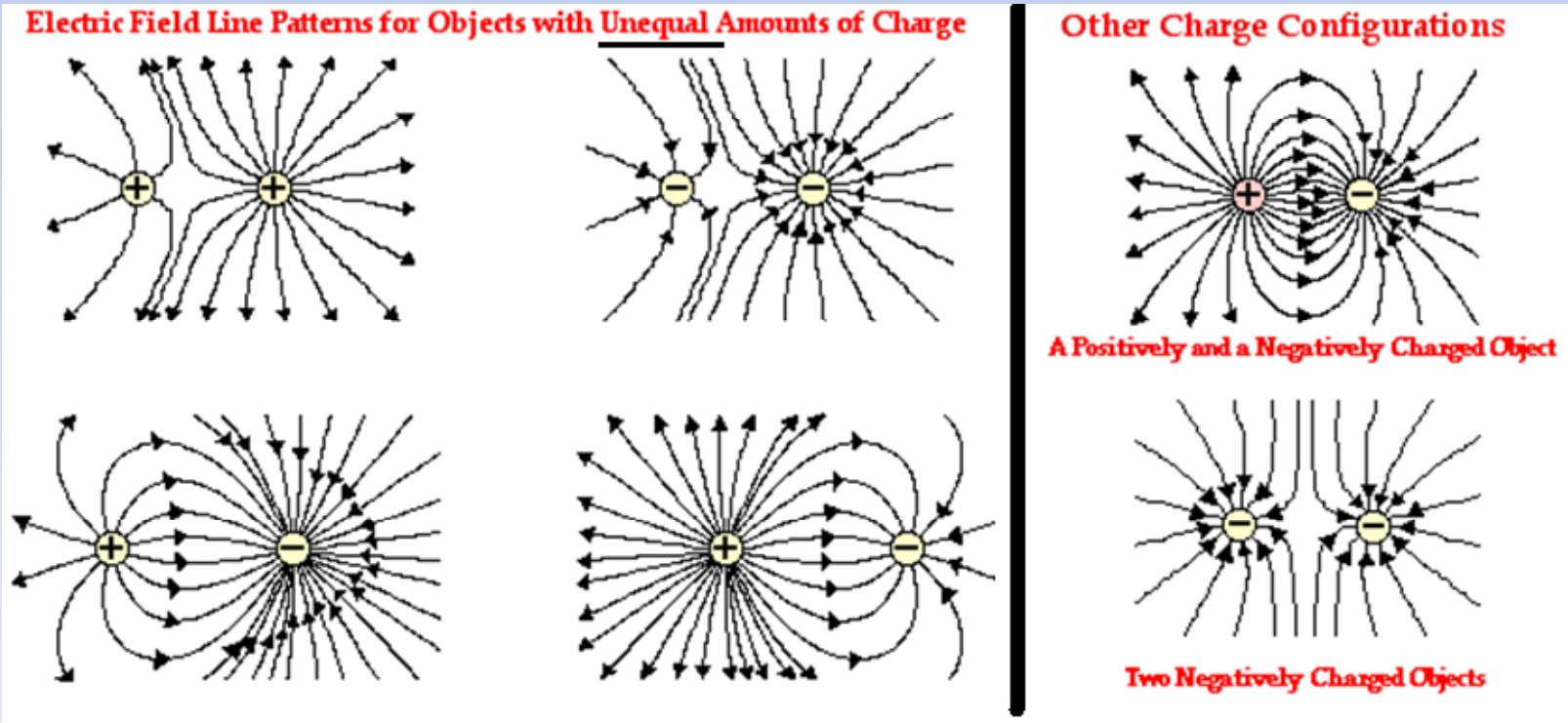
Sharp Points

- Electrons distribute to avoid other electrons
- Sharp edge: No room to spread out – electrons near sharp point must crowd together for balanced forces
- Result: Electrons crowded near sharp points and knife edges



Electric field strength

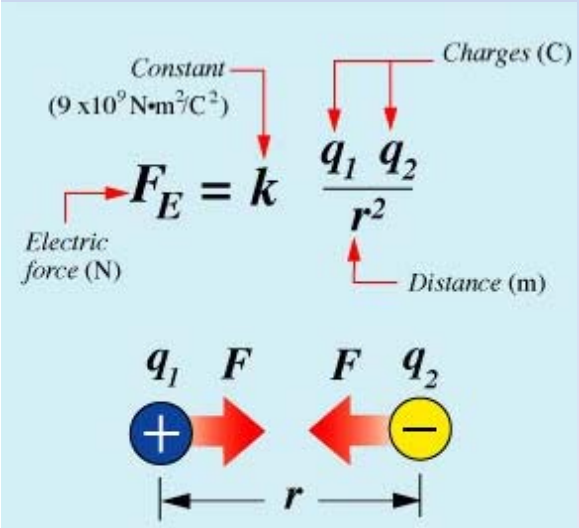
- Drawing arrows everywhere: too hard
- Curved lines show
  - Vector direction and patterns (good resource): http://www.physicsclassroom.com/Class/estatics/U8L4c.cfm
  - Field strength: "density" of lines
  - Notice arrows show what would happen to pos. charge?
  - Pretend you are the positive test charge! See the charge, be the charge!
  - For the un-equals, can you tell which charge is bigger?

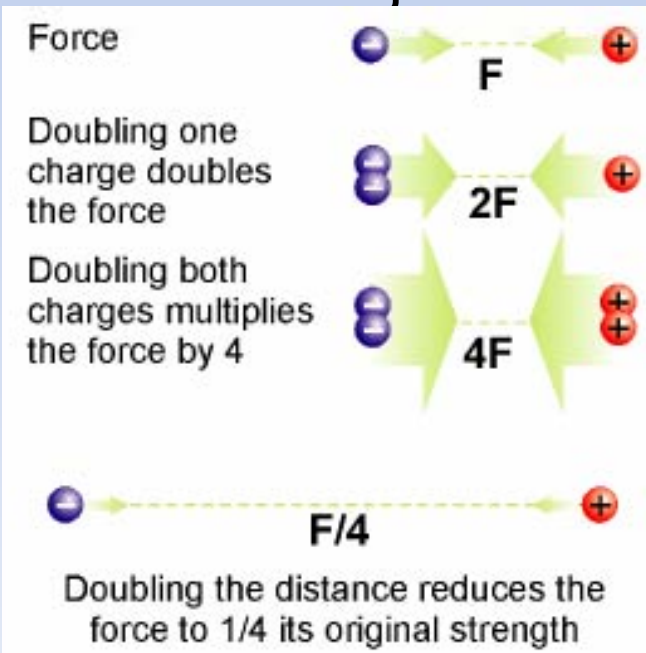


Coulomb's law practice

$F = kq_1q_2 / r^2$

- Assume F = 12 N. What happens to the force if q_1 is doubled?
- Assume F = 12 N. What happens to the force if both q_1 and q_2 are doubled?
- Assume F = 12 N. What happens to the force if r is doubled?
- Assume F = 12 N. What happens to the force if r is halved?
- Assume F = 12 N. What happens to the force if the objects are brought 10x closer? 10 x farther?





Coulomb's law practice

$$F = kq_1q_2 / r^2$$

- Always make sure that F is in Newtons (N), q is in Coulombs (C) and d is in meters (m)
- The formula will be given to you on the test
- Remember from previous notes, k = 9e9 (keep other units right and you won't have to worry about units for k)
- Example: Two identical positive charges of 75 nC exert a 50 mN repulsive force. How far are they from each other? *(0.032 m, or 3.2 cm)*

Calculating electric field strength
$E = F/q$ ($E = kq/d^2$)

- Always make sure that F is in Newtons (N/C), q is in Coulombs (C) and d is in meters (m)
- The formula will be given to you on the test
- Remember from previous notes, k = 9e9 (keep other units right and you won't have to worry about units for k)
- Example: What is the magnitude of electric field strength 6.00 cm from a 500 nC charge? *(1,250,000 N/C)*